

Flight, November 19, 1910.

# FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

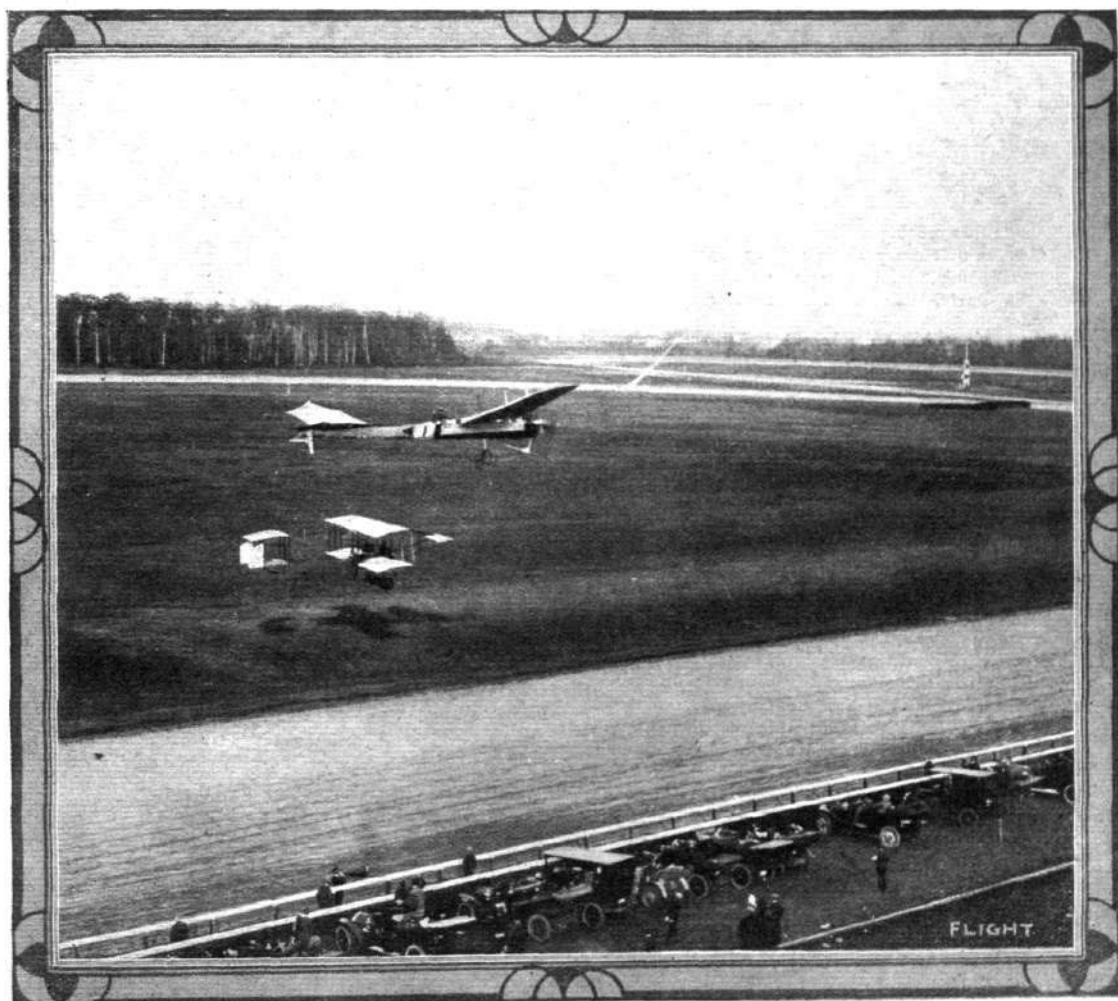
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 99. (No. 47. Vol. II.)

NOVEMBER 19, 1910.

[Registered at the G.P.O.  
as a Newspaper.]

[Weekly, Price 1d.  
Post Free, 1½d.]



AT BELMONT PARK (N.Y.) INTERNATIONAL MEETING.—Hubert Latham, on his Antoinette, passing directly over Grahame-White on his Henry Farman during one of the competitions.

# THE GYROSTATIC FORCE OF ROTARY ENGINES.

By ALBERT KAPTEYN, President of the Aviation Section of the Dutch Aero Club.

GYROSTATIC action is more familiar in name than in principle to the majority of laymen, and even those who have had some training in mechanics often seem to have but a superficial and sometimes inaccurate conception of the force in question. It is, however, a subject that ought to be thoroughly well understood by everyone associated with the use of rotating masses, and, above all others, pilots of aeroplanes ought to be thoroughly *au fait* with its action, because the flying machine affords greater possibilities for its demonstration than almost any other conceivable apparatus. The reason for this is obvious when we consider the nature of gyrostatic force. It is a force that comes into play when the axis or shaft of a rotating body is itself rocked from its original position. Take, for example, the propeller-shaft of a flying machine. So long as the machine proceeds in an absolutely unswerving path, the gyrostatic force of the rotating propeller, or the rotary engine if such happens to be used, remains dormant. But, for how long does an aeroplane follow an absolutely unswerving path? Scarcely for a second of time. Almost every instant it is being steered either to the right or to the left, and often it pitches in its line of flight. Every such motion rocks the axis of the propeller-shaft and brings into life the dormant gyrostatic force, the magnitude of which depends on the rapidity with which this rocking motion takes place. It is therefore obvious that the gyrostatic force will be most in evidence when the pilot is attempting to execute a very quick manoeuvre, such as turning about in a very short circle.

It is notorious that several fatal accidents have taken place recently under circumstances of this sort. Feeling convinced, therefore, that gyrostatic force is sufficient to cause dangerous interference with the control, and having found that many aviators are sufficiently acquainted with the principles of gyrostatic action to really enable them to appreciate when some difficulties, that they have attributed to the weather, might in reality have been due to this very force, I have thought it well to endeavour to treat the subject hereunder in simple but nevertheless, I hope, convincing terms. There is, moreover, all the more reason to treat the matter scientifically at this juncture, because nothing is so calculated to raise scepticism in the minds of those who do not know, than the very erroneous conclusions that have of late been advanced by some of those who profess to recognise the dangers of this very force. Some people seem to think, for instance, that gyrostatic action may be the direct means of fracturing main spars, struts, tie wires, or other constructional members that are not in any way directly related to the axis of the revolving shaft. It may be said at once that so far as any direct effect of gyrostatic action is concerned, the only constructional damage it is likely to do is to bend or break the propeller-shaft, and it is essentially my purpose in this article not so much to write a warning on this aspect of the case as to point out that the immediate consequence of gyrostatic action is interference with control.

The outstanding feature of gyrostatic reaction is that it takes place in a plane at right angles to that of the applied force and also to that of the axis of rotation of the shaft. Thus, for example, in a steamship pitching through the waves the gyrostatic reaction from a turbine shaft placed fore and aft exerts a pressure on the sides of the bearings,

not on the tops and bottoms as might be supposed, and as would in fact be the case were the shaft at rest and only its ordinary inertia to be taken into account. Similarly, in an aeroplane, if it pitches in its line of flight the gyrostatic reaction tends to upset the steering, and conversely if it is steered off a straight path the gyrostatic reaction tends to make it pitch. The question as to whether the nose of the machine will tilt or dip depends on the direction of rotation of the motor and the direction in which it is steered. Suppose the aeroplane to be a monoplane with a tractor screw and that the motor has a clock-wise rotation viewed from in front; then steering to the left, *i.e.*, keeping the pylone on the left hand, will tend to make the machine dive. If the same engine is placed on a biplane so that the propeller is behind, the rotation of the shaft will have been reversed in respect to the direction of turning, consequently the machine will tend to tilt during the same manoeuvre.

It will be instructive to see what magnitude such forces take with machines as they may be actually constructed. For example, let us suppose that we have a powerful rotary motor, weighing 100 kilogrammes, driving a propeller weighing 10 kilogrammes at 1,200 r.p.m.; let us further suppose that the radius of gyration of the motor is .33 metre and that of the propeller .83 metre. The gyrostatic reaction will have a magnitude depending on the rapidity with which the course of the aeroplane is altered in flight. We will imagine that the pilot completes an angle of 90°, or in other words, changes to a line of flight at right angles to his original path, in three seconds. Wilbur Wright, it may be mentioned, frequently made such an angle in one second and less.

Applying these values, the gyrostatic couple produced by the motor is 73.5 kilogramme-metres, and that produced by the propeller is 42.4 kilogramme-metres, the combined effect being thus 116 kilogramme-metres. This force is a torque tending to make the machine dive or tilt as the case may be, and the principal means at the disposal of the pilot for resisting the action is the elevator. If we suppose that this member is situated 10 ft. 6 ins. from the centre of gravity, an upward or downward thrust of about 80 lbs. will be exerted upon it solely as the result of this gyrostatic force. Taking elevator planes of the sizes found on most machines, it may be stated as a rough approximation that the loading represented by such a force is approximately of the same order as that normally carried by the main planes themselves.

This gyrostatic reaction on the part of a rotating mass can be very easily demonstrated by anyone who cares to spend a few pence and a couple of hours in the construction of a rough and ready model such as is illustrated in Fig. 1. The model represents a rough approximation to a monoplane, cut out of a piece of stiff cardboard. It need not be accurate in any way so long as it has a couple of wings and some sort of a tail. Its head is stiffened by a piece of board, A, in which is cut a square opening to receive a gyroscopic top such as may be bought for a shilling at any toy shop. The frame of this top must be clamped down to the board so that the axis of the spinning-shaft lies fore and aft and the top is quite free to rotate. The two wings of the model are stiffened by attaching a strip of thin wood underneath them in the form of a main transverse spar, and the extremities are

whittled down into a round section so that they can be mounted freely in the upright supports of the frame, which is made as shown in the sketch. To the head and the tail of the model a piece of bent cardboard must be attached, as shown at C, in order to bring the centre of gravity somewhat under the axis of suspension. The whole must then be balanced by adding a small piece of wood to one end or the other.

As long as the top is at rest, the board on which the model is mounted can be moved across the face of a table

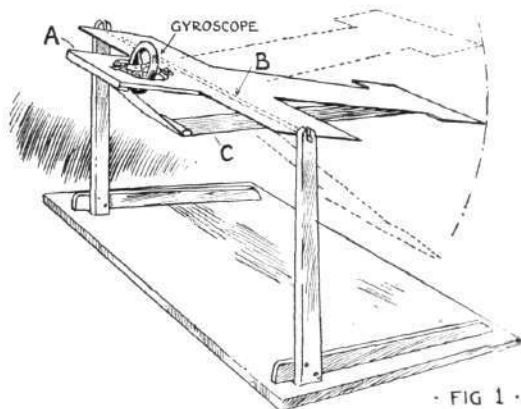


FIG 1.

Sketch illustrating a simple model that can be used to demonstrate the effect of gyrostatic force on the control of an aeroplane.

in any direction without affecting the balance of the model, but when the top is set spinning an entirely different state of affairs exists, for directly the board is turned so as to make the model reproduce the action of steering to the right or left, the gyroscopic reaction will immediately cause the model as a whole to dive or tilt.

Possibly some may think that the quantitative analysis made above represents an exaggerated case, but lately some flying machines have been fitted with 100-h.p. motors weighing 100 kilogrammes. Furthermore, a turn at right angles in three seconds is nothing exceptional, for, as stated, Wilbur Wright often made such a turn in one second, and if we calculate the gyrostatic couple, for such a quick movement, on similar lines as above, we find that this couple amounts to 340 kilogramme-metres.

On the other hand there is one aspect of the problem which makes it necessary to consider the worst case.

Even though a pilot may take precautions to the extent of not voluntarily turning too quickly, nevertheless in windy weather the action of the wind itself may force the machine suddenly to change its position and thus bring these very gyrostatic forces into exaggerated effect.

Having explained the danger, it would be incomplete not to discuss its remedy, which is that of duplicating the rotating members and making them rotate in opposite directions. It does not at present seem feasible to do this with rotary engines, but with stationary engines, where only the propellers create a gyrostatic effect of any appreciable magnitude, it is not difficult to employ two propellers rotating in opposite directions. This has been done by the Brothers Wright, and there is very little doubt in my mind that they have actually accomplished manoeuvres in the air with their machine of such intricacy as could not safely be made on an aeroplane where this

precaution of neutralising\* gyroscopic action has not been taken. No other pilot that I have ever seen has ever executed turns and figures of eight with the same rapidity as Wilbur Wright was at one time accustomed to carry out on his own twin-screw biplane, and I feel convinced that it is not only in the relative skill of the pilots that we must seek for the reason.

Those who may be inspired to make the little model that I described above, may conceivably be interested in having a mental conception of the mechanics of gyrostatic action, and although the subject is one of great intricacy in its complete elucidation there is no reason whatever why anyone should not be able to carry away a very clear idea of the actions and reactions that bring about the particular phenomena under consideration. For this purpose I have prepared a little diagram (Fig. 2) showing a spinning disc, and have supposed that the spindle, *a*, *b*, of the disc has been forcibly rocked over in the direction,

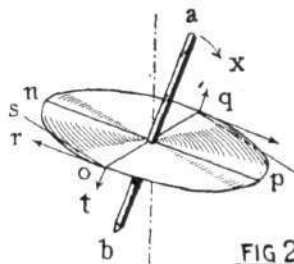
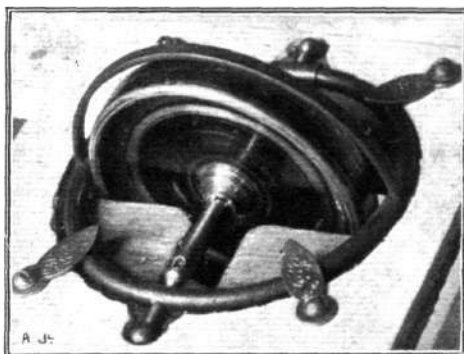


FIG 2.

Diagrammatic sketch illustrating the nature and direction of the gyrostatic forces in a spinning disc.

*x*, so that it is caused to assume the inclined position illustrated. It is our purpose to investigate the forces called into being at the moment that this displacement tends to commence. Across the face of the disc I have drawn a diameter, *o*, *q*, representing the axis about which the spindle is turning in the direction, *x*, and from the point, *o*, are drawn two tangential lines, *o*, *r* and *o*, *s*, the



Photograph illustrating how an ordinary toy gyroscopic top can be mounted in the model shown in the sketch.

\* We would point out that when the rotating members are not located on the same axis, their individual gyrostatic forces, being of opposite signs, create a couple that stresses the framework of the machine between the axes in question. Thus, for example, the gyrostatic forces of the two propellers on a Wright biplane must tend to twist the structure, which is, of course, sufficiently strong to prevent damage, although the algebraic sum of the two forces, as affecting the control of the machine, is zero.—ED.

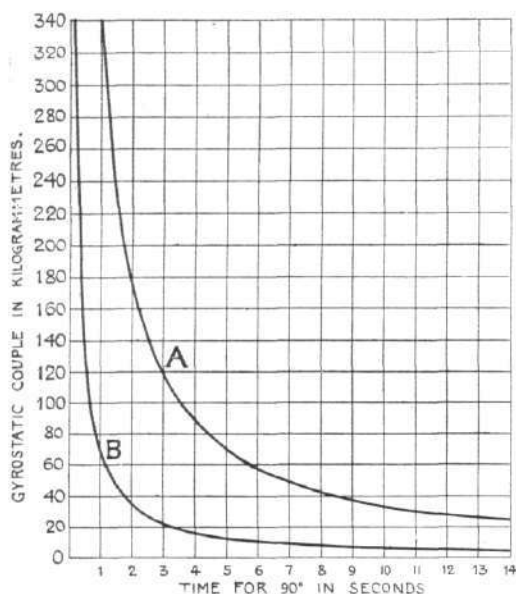
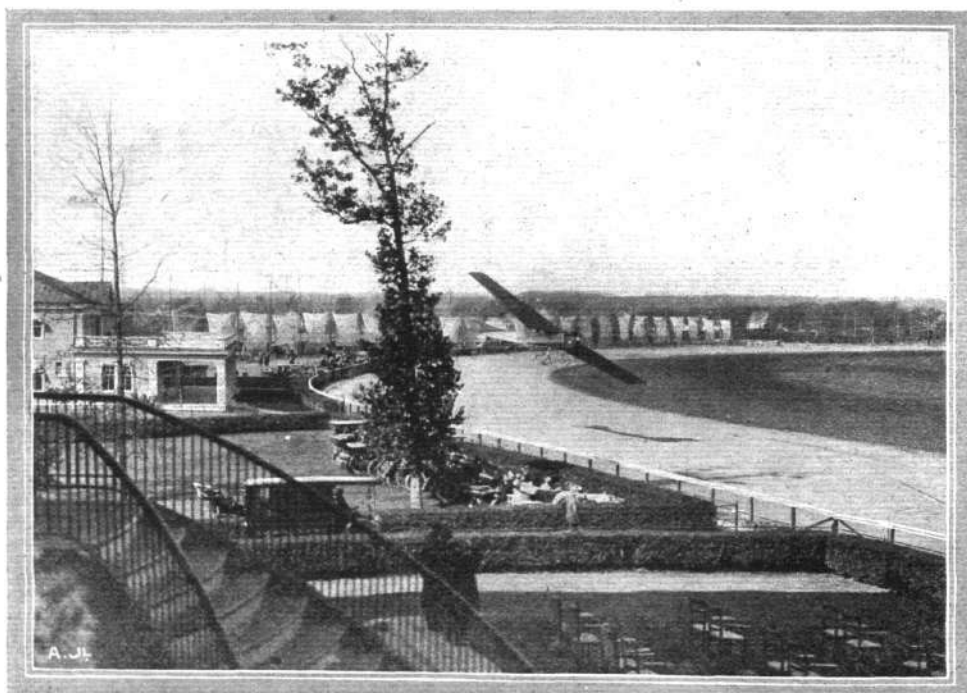


Chart showing the magnitude of the gyrostatic couple caused by changing the direction of flight to a line at right angles to the original path in the time stated. Graph A shows values for a rotary engine weighing 100 kilogs. operating a propeller weighing 10 kilogs., while Graph B shows values for a stationary engine driving a propeller weighing 5 kilogs. also at 1,200 r.p.m.

first named representing the direction in which a particle of the disc at  $o$ , was travelling before the spindle moved, while  $o, s$  represents the direction of the same particle after the spindle has been displaced. Now, it is very obvious that this change in direction of the movement of the particle can only have been brought about by the application of an upward force, and by Newton's laws it is equally obvious that the action has been resisted by a downward reaction, which I have represented by the line,  $o, t$ , on the diagram. At the other extremity of the diameter,  $q$ , the reaction will, for the same reason, be upward. These reactions constitute a couple, called the precessional couple, that tends to turn the disc about a line,  $n, p$ , at right angles to the line,  $o, q$ , and to the line,  $a, b$ , or axis of rotation of the disc. The particles of the disc at  $n$  and  $p$ , where  $n, p$  represents a diameter at right angles to  $o, q$ , do not give rise to gyrostatic reaction, because the new direction of their movement has remained parallel to their original path. From this diagram it should be quite evident that two similar discs rotating in opposite directions, but upon the same axis, would completely neutralise each other's gyrostatic reaction.

In order further to assist any readers of FLIGHT who may be interested in this important subject, I have prepared a chart showing by means of a graph, A, the gyrostatic couple produced by the masses taken in the special case already discussed. The base line of the diagram represents the time taken to turn through  $90^\circ$  while the vertical scale represents the gyrostatic couple in kilogrammetres. The lower curve, B, shows values for an ordinary stationary motor fitted with a single light propeller, weighing 5 kilogrammes, and having a diameter of 2.40 m., making 1,200 revolutions per minute.



A CLOSE THING.—Hubert Latham blown out of his course at Belmont Park (N.Y.) Meeting during the contest for the Gordon-Bennett Cup.



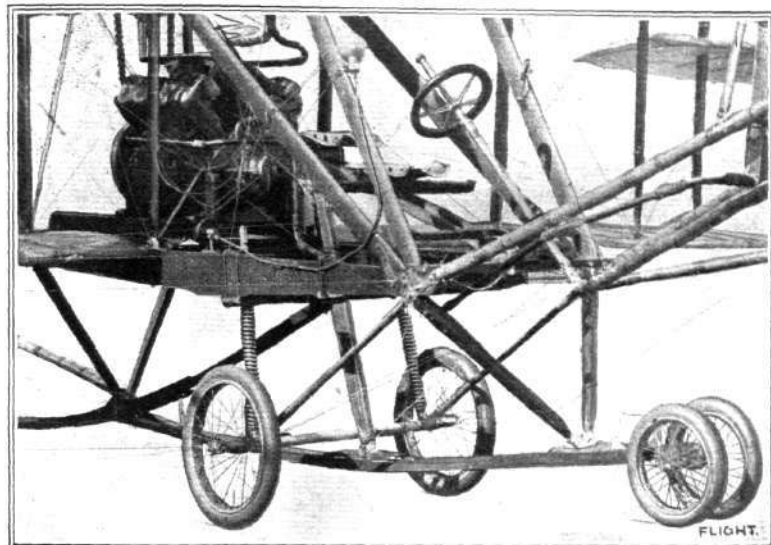
## THE CODY BIPLANE.

(Concluded from page 925.)

CENTRALLY in front of the pilot's seat is a steering-wheel on an inclined column, arranged in exactly the same way as a steering-wheel on a motor car. As far as turning the wheel for steering is

In addition to the rotary motion of the steering-wheel, the steering-column itself is mounted on a universal trunnion about one-third of its length from the bottom, and it is thus capable of acting

as a powerful lever for the manipulation of the elevator and balancing planes. The elevator on the Cody biplane differs constructionally from that on any other machine in being divided into two parts, which are placed side by side; each half is connected to the control-lever by means of a bamboo rod, and the connections are such that the two planes can be made to operate in unison or in opposite directions. When they operate in unison the device is an elevator pure and simple, but when one half is tilted and the other dipped the action is supplementary to that of the balancing planes mounted in the gap of the main planes under the trailing edge. This double elevator, and its use as a balancer, is quite a special feature of the Cody machine, and is one of the several original ideas of its designer. The balancing action is obtained by a sideways motion of the steering-column, which so thrusts on the bamboo connections of the elevators as to move these two members in opposite directions. Simultaneously a supplementary mechanism, consisting of a rock-shaft and a lever, pulls down the trailing edge of one of the balancers against the action of a spring. The arrange-

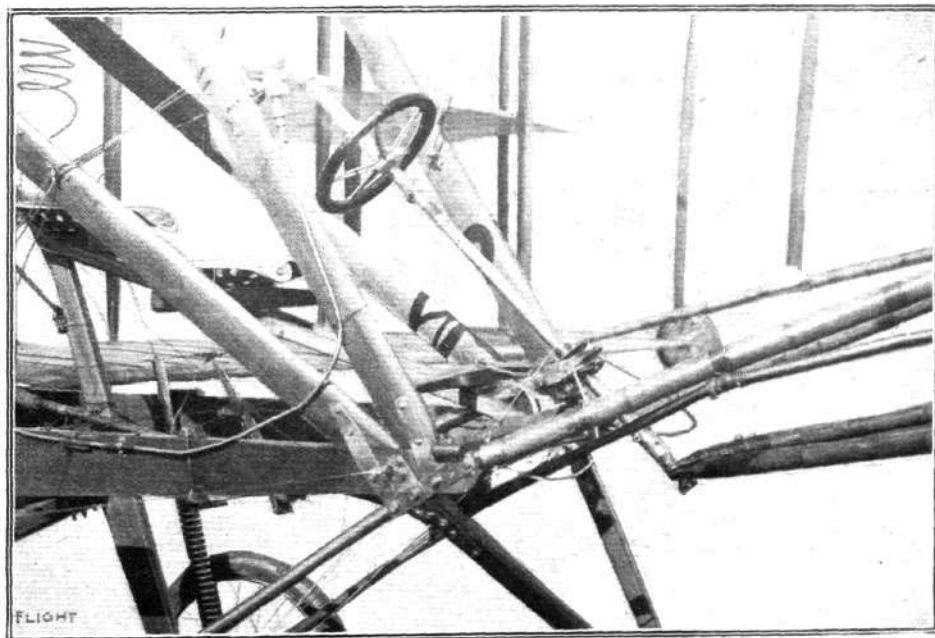


Detail view of the under-carriage on the Cody biplane.

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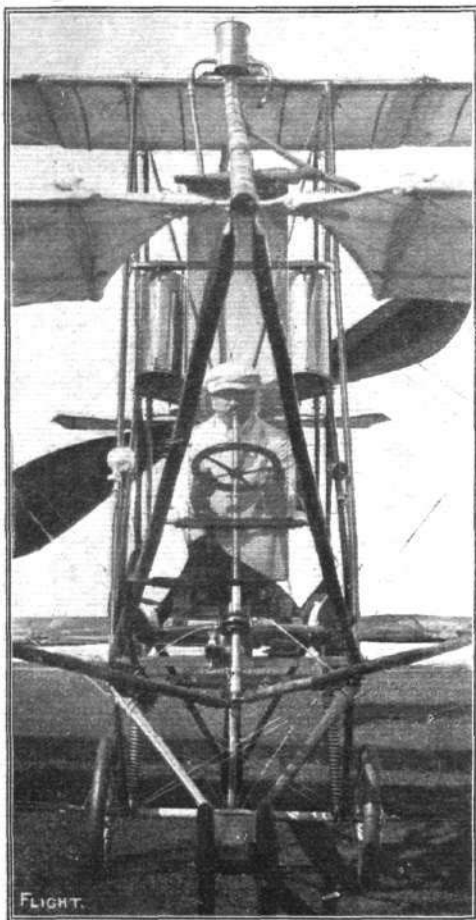
concerned, the operations are likewise analogous. The wheel is connected with the rudder, which is carried on an outrigger at the rear of the machine.

ment of the balancing-planes on the Cody biplane is such that they are normally held in a horizontal position by springs, and only one of them can therefore be pulled into a position of positive lift by the



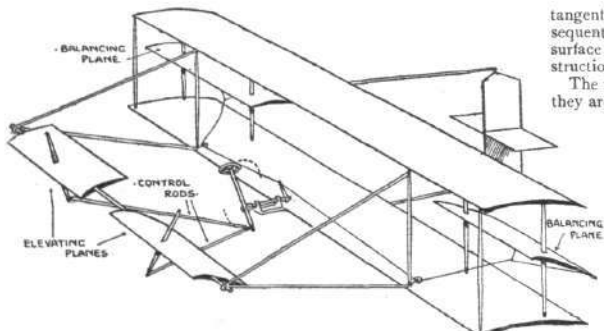
View of the steering-wheel on the Cody biplane.

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Front view of the pilot's seat on the Cody biplane, showing Mr. Cody at the wheel. This photograph is taken through the radiator, which protects the pilot to a certain extent in cold weather. That the radiator is no obstruction to the view in this position may be judged from the above picture.

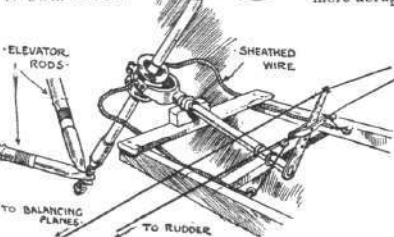


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Diagrammatic sketch illustrating the use of the elevators as balancers on the Cody biplane, and also the simultaneous action of one of the main balancing planes.

control; the other balancer, although it may be dipped by the action of the spring, cannot exert a downward thrust, by virtue of this attitude, of a greater magnitude than the springs themselves can support. Interconnected with the balancer mechanism is the rudder—which, as already explained, is capable of independent operation by turning the steering-wheel—and this member is likewise put over in synchronism with the balancing movements. It will be observed, as an outstanding feature of the Cody control, that the balancing forces are brought to bear upon the machine at several points, and it can be readily appreciated that in large aeroplanes of this kind such a feature may be very desirable in order to guard against failure through undue local stress. With the exception of the rather small horizontal tail plane, which is quite flat—and can really almost be regarded more as a member for trussing the rudder, to which it is permanently fixed, than as a factor of great importance in the stability of the machine—all the planes on the Cody biplane are cambered to carry load. And, in connection with the camber of the main planes, there is another original feature which it is only fair to designate as the "Cody curve."

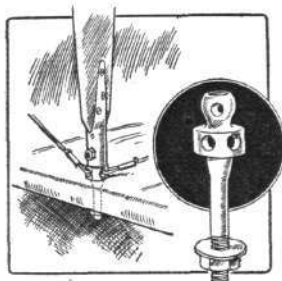
The section of the main planes is very peculiar, and it is rather curious that the peculiarity in question would scarcely ever be by the expert eye, for it is on the finished machine, pronounced in an indistinct way, of the accompanying sketches, a main plane rib, noticed that the underside more abruptly than the top side, so that the two laths of which the rib is built up touch one another at a point about one-third of the chord from the leading edge. The attitude of the main planes in respect to the normal axis of flight is such that the upper surface is practically tangential to the line of flight in the vicinity of the leading edge, consequently the lower surface has a dipping front edge and the upper surface has not. Mr. Cody claims for this particular system of construction that it produces the most efficient plane that he has ever tried.



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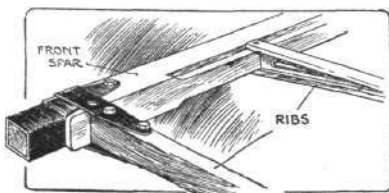
Sketch illustrating how the steering-column simultaneously operates the balancing-planes and the rudder when moved sideways.

The main planes are built up in sections of 8 ft. span each, and they are divisible into these sections when the machine is dismantled



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Sketch illustrating how the vertical struts are fastened by a ball-socket joint to the main spars in the Cody biplane. Inset is an illustration of the bolt.



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Sketch illustrating how the main ribs are fastened to the main spars by a steel strap on the Cody biplane.



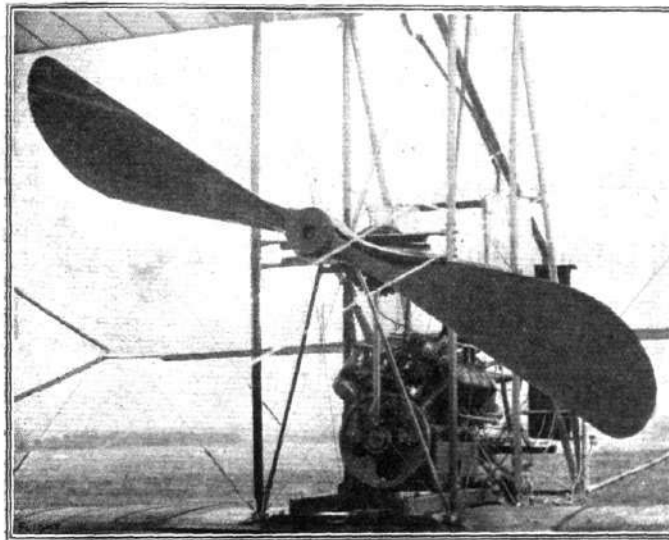
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The Cody rib. Sketch illustrating the peculiar camber of the ribs employed on the Cody biplane. The top surface has its entering edge tangential to the line of flight so that the under surface has a dipping front edge.

or transport. The joint between sections is completed by a rectangular steel sleeve, and the spigoting ends of the spars are fitted with steel ferrules.

Steel traps are also employed to brace the spars to the main ribs, which occur at these joints. The upright struts separating the upper and lower main planes coincide with the main ribs, and a very ingenious fastening has been employed for their attachment. The struts themselves are of stream line section, and their tapered

The power plant on the Cody biplane, as illustrated, consists of a 65-h.p. E.N.V. engine, which drives by a single chain a propeller of 10 ft. 2 ins. diameter and 10 ft. 8 ins. pitch. The speed of the propeller is 600 r.p.m. when the engine is running at 1,200 r.p.m. One very interesting point in connection with the machinery on the Cody biplane is the presence of a radiator immediately in front of the pilot, and Mr. Cody asserts that he has found great benefit from this in cold weather through the air being slightly warmed before it strikes his body. The degree to which aeroplane pilots suffer from the cold while flying is sufficiently well-known to make an idea of this sort well worthy of consideration.



View of the engine and propeller on the Cody biplane.



Mr. Cody and his propeller.

extremities are spliced into hollow steel ferrules. The ferrule rests upon the cylindrical collar of a specially shaped bolt that passes through the steel strap binding the main spar to the main rib, and has, above the collar, a spherical head that is enclosed by the ferrule. A bolt fastens the ferrule to the spherical head of the bolt, but the joint is essentially a loose connection, and in principle belongs to the ball-socket type. The remainder of the bracing is, of course, effected by steel wires arranged diagonally, and it is also important to remark that the end thrust on the main spars is taken by diagonal wires that tie the spars to the axle of the under-carriage.

When the machine rises off the ground the pressure of the springs used for the suspension of the wheels thrusts down upon these diagonal tie wires, and puts 2 cwt. of tension on them.

Silver spruce is mainly used in the construction, but the outriggers carrying the elevator and tail are of bamboo. The tail outrigger is hinged, so that the tail can be folded against the main planes in order to save room in accommodation. The under-carriage is made entirely of hickory.

The following summary of some of the principal dimensions and minor details of construction will supplement the data given on the full-page drawing. The span of the main planes is 46 ft., and the main spars have an inverted dihedral of 9 ins. The chord is 6 ft. 6 ins., and the camber 4 ins. in height one third from the leading edge. The gap is 8 ft. 6 ins. The whole of the centre portion of the machine is designed to be accommodated in a railway truck without dismantling. The centre of gravity is located approximately on the front spar. With the exception of a few fittings in the centre of the machine, aluminium is not used in the construction. In every case where bamboo is employed the cane is bound with cord in the middle of each section. The upper bamboo strut carrying the elevator is 3 ins. in diameter, and those beneath are 2 ins. in diameter each. The bamboo poles used for operating the elevator are about 1½ ins. in diameter. The vertical struts in the gap of the main planes have a 4½ by 1½ in. section. They weigh 5½ lbs. each, including the nuts and bolts at their extremities. Between the upper and lower surfaces of the main planes the ribs are trussed by diagonal wires. The planes are surfaced with Pegamoid.

# ALEXANDER PRIZE FOR BRITISH MOTORS.

ACCORDING to the results issued in connection with the competition for the Alexander prize of £1,000, it appears none of the three engines submitted succeeded in fulfilling the essential condition that they should maintain 35-h.p. for 24 hours, and in consequence the prize has not been awarded. Only one engine—the Green—succeeded in running for the full period and this gave 31½-h.p. for

24 hours, although subsequently it gave 36¼-h.p. during a run of 7 minutes.

The Wolseley and Humber motors were withdrawn from the competition before they had completed the 24 hour test at full load; the former owing to cracked cylinders, and the latter owing to a cylinder-head blowing off.

# AEROPLANE SILHOUETTES FROM THE PARIS SHOW.

## THE MAURICE FARMAN BIPLANE.

FRENCH-BUILT biplane with forward elevator working in unison with elevator on tail. Planes double-surfaced throughout. All control wires duplicated. Similar in type to the Henry Farman biplane. Holds at the present time world's record for duration of flight. Maurice Tabuteau on an M. Farman biplane with Renault motor flew at Etamps for 6h. 1m. 35s., covering 465 kiloms.

*General dimensions.*—Bearing surface, 50 square metres; length overall, 12.745 metres; width, 11 metres.

*Seating capacity.*—Two, one behind the other.

*Engine.*—Renault, 8 cylinders, V type, air-cooled of 60-h.p.; weight, 170 kilogs. Propeller is mounted on the cam-shaft. Any motor fitted.

*Propeller.*—One Chauvière Intégrale of two branches, 2.75 metres to 3 metres in diameter; pitch, 1.60 metres; normal revolutions, 900. Situated behind main planes.

*Chassis and skids.*—The two skids are continued forward and upward until they join the front elevating plane. Two wheels are fitted, with spring suspension, to the skids, and are joined by a light axle.

*Tail.*—Biplane tail having two rudders hinged to the rear struts of the cellule. Elevators are attached to the trailing edges of both tail planes, and are connected with and operate simultaneously with the front elevator.

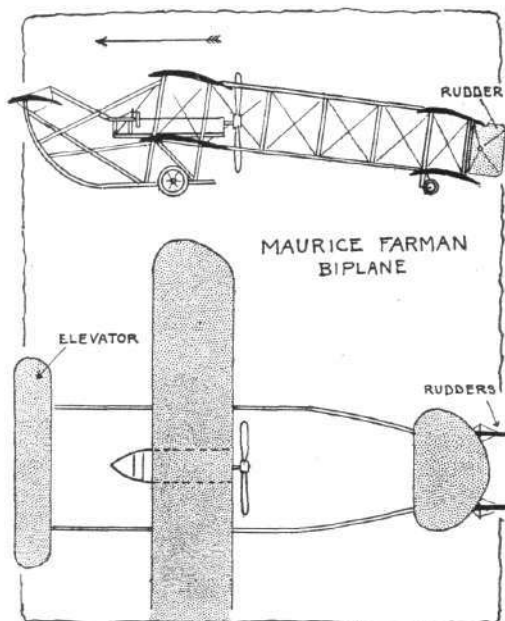
*Lateral stability.*—By ailerons fitted to the trailing edges of both the upper and lower planes.

*Weight.*—Without motor, 250 kilogs.

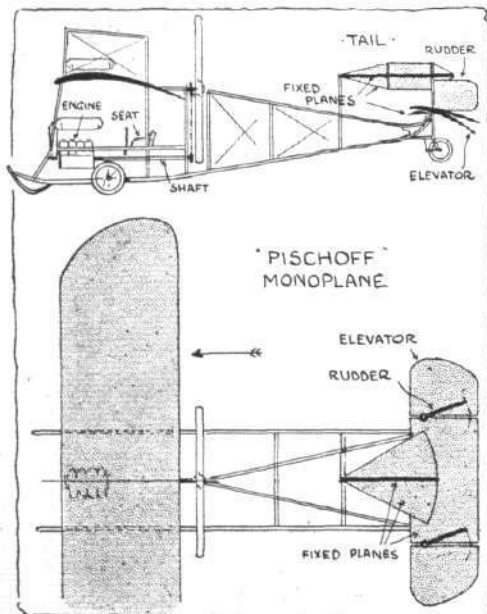
*Speed.*—About 80 kiloms. an hour.

*System of control.*—By a wheel at the end of a horizontal shaft, moving in a sleeve, and mounted on ball-bearings. Pulling the wheel elevates the machine; pushing depresses the elevator. Rotation to the left depresses the right ailerons, and similarly rotation to the right affects the left ailerons. Foot pedals control the rudders.

*Price.*—Without motor, 14,000 francs; with 60-h.p. Renault, 28,000 francs.



## DE PISCHOFF MONOPLANE.



FRENCH-BUILT monoplane with seats, engine, and landing-chassis placed beneath the main plane. This machine was designed and experimented with in Austria, but has since been developed in France.

*General dimensions.*—Total bearing surface, 27 square metres; length, 9 metres; width, 11 metres.

*Seating capacity.*—Two, seats placed side by side.

*Engine.*—Daimler (Austrian) 4-cyl. vertical, 60-70 h.p., water-cooled. Engine and radiator placed in front as on motor car, a driving-shaft and clutch intervening between the engine and sprocket-wheel driving the propeller. E.N.V. and Gnome motors also fitted.

*Propeller.*—Designed by M. de Pischoff; of two branches. It is placed behind the main planes, and is driven by chain from a sprocket-wheel on the propeller-shaft.

*Chassis and skids.*—The chassis is very similar to that of a motor car, with the radiator mounted in front of the engine. The long skids are practically prolongations of the lower members of the main frame, and are fitted at their forward ends with auxiliary skids to take sudden shocks. Two wheels are fitted below the tail.

*Lateral stability* is maintained by the flexing of the trailing edge of the wings.

*Tail.*—Elevation is regulated by the movement of sections of the tail. Double rudders are fitted, and above them is a small triangular fixed tail plane with vertical fins both on the upper and under sides. The tail is of the lifting type.

*Weight.*—Complete with engine, 360 kilogs.

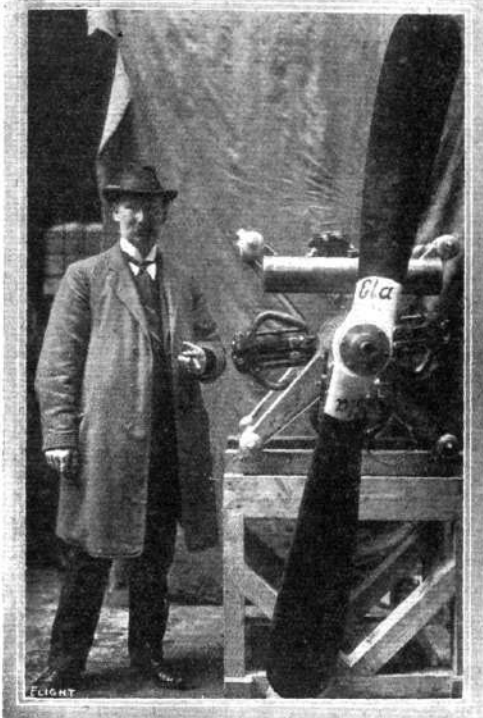
*Speed.*—85 kiloms. an hour.

*System of control.*—By a single lever placed in front of the pilot. A backward movement raises the aeroplane, a forward depresses the machine, a right-hand action flexes the left wing, and a left-hand does the opposite. A foot-pedal controls the double vertical rudders.

*Price* of two-seater, with 60-70-h.p. Daimler (Austrian) motor, 27,000 francs.



## THE PARADOX ROTARY ENGINE.



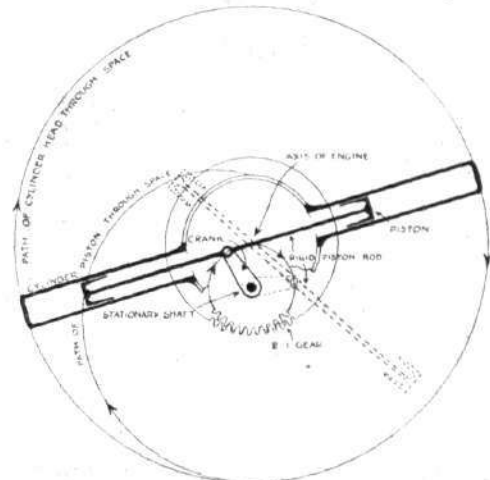
End view of the 4-cyl. Paradox rotary engine.

AN interesting rotary engine for aeroplanes, which has many uncommon features, has been introduced into this country by Mr. Carl Deissner, and an actual motor can be seen in operation in London by those interested. Externally the Paradox engine is an ordinary 4-cylinder rotary engine, and has nothing very peculiar about it, except that the valves are all mechanically operated in an ingenious way by skew-gearing. Internally, however, the motor is quite different from anything that is at present in actual use; and, although the principle is not entirely new, the manner in which it has been carried out is, so far as we are aware, novel. The characteristic feature of the Paradox engine is that opposite pistons are connected together by one rigid and straight piston-rod, which also serves the purpose of a connecting-rod, inasmuch as it is attached at its centre to the crank-pin of a crank-shaft.

If for the moment we disregard the fact that the engine rotates *en bloc*, and merely consider the action of a pair of opposite pistons, their motion would obviously be to and fro, and the path of the central point on the piston-rod a straight line. But in practice the cylinders do rotate, and the engine being designed to operate on the four-stroke cycle, a cylinder makes half a revolution about the axis of the engine during the time that the piston travels the length of its stroke. This combination of motions makes the resultant path of the centre point on the piston-rod a circle, and the radius of the circle is one quarter of the stroke of the piston. It follows, therefore, that if the centre point on the piston-rod is connected to a crank having a throw equal to a quarter of the stroke, and the said crank-shaft is caused to rotate at twice the speed of the engine and in the same direction, then the engine will be in a condition to operate. This is in effect what is provided in the Paradox motor, the engine

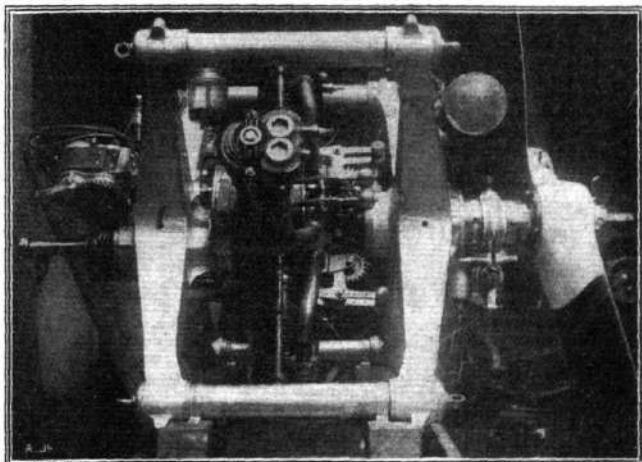
and the crank-shaft being geared together by a two-to-one ratio, in order to regulate their respective velocities.

This interconnection by gearing is the special constructional feature of the Paradox engine, the inventor claiming that no other similar engine has hitherto been constructed with this positive connection between the engine-casing and the crank-shaft. Theoretically such an engine should work without this gearing, because the action and reaction between the two members would necessarily cause them to exactly follow their respective paths if either one of them moved at all. It only requires a few moments' study of a diagrammatic sketch of such an engine as this, however, to show that the reactions under such conditions would throw a terrific bending strain

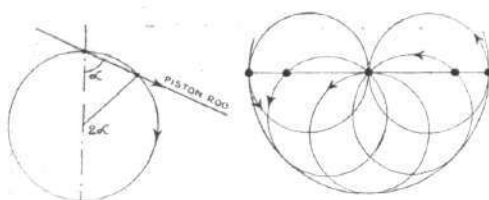


Diagrammatic sketch illustrating the principle of action of the Paradox rotary engine, also showing the relative paths of the piston and cylinder.

on the piston-rod, and very heavy pressure on the walls of the cylinders. In the Paradox engine the use of a positive-gear connection maintains the relative motion as an independent function, and thus eliminates any tendency to build up a cumulative bending stress on the connecting-rod; and so far as pressure of the pistons on the walls of the cylinders is concerned, this is only such as result



The Paradox rotary engine, showing the skew gears that operate the valves and drive the magneto. In the aeroplane type of motor the heavy framework supporting the engine is abolished.



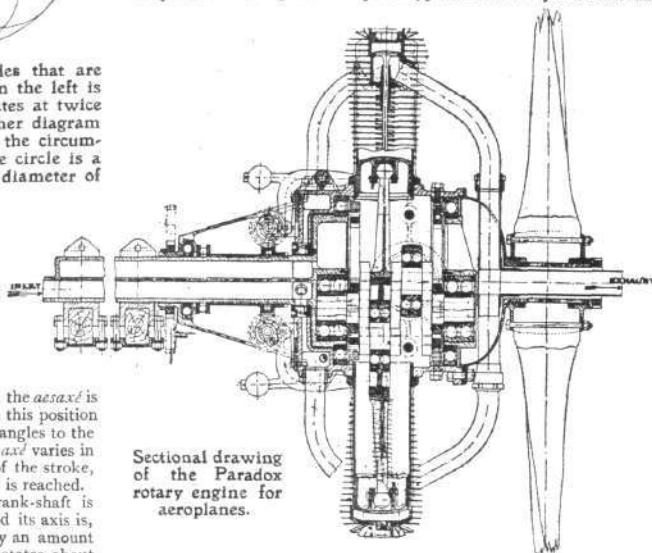
Diagrams illustrating two geometrical principles that are related to the action of the Paradox engine. On the left is a diagram illustrating why the crank-shaft rotates at twice the speed of the engine, and on the right is another diagram illustrating that the path traced by a point on the circumference of a small circle rolling within a large circle is a straight line when the small circle is half the diameter of the large circle.

from the ordinary variation of gas-pressure and relative differences in the angular velocities of the piston and cylinder about the axis of engine-rotation. It is rather interesting to observe, in connection with the Paradox engine, that it possesses in some degree the characteristics of a stationary *desaxé* engine, the curious point about its operation being that the amount of *desaxé* is variable. There is, for instance, the dead centre, where the *desaxé* is zero; but when the engine has made a quarter of a revolution, the *desaxé* is a maximum, being equal to the throw of the crank. In this position the pressure along the piston-rod is absolutely at right angles to the crank. Between these two extremes the amount of *desaxé* varies in degree, being less pronounced during the early part of the stroke, but increasing very rapidly until the maximum position is reached.

At this point it is necessary to explain that the crank-shaft is mounted on ball-bearings inside the crank-chamber, and its axis is, of course, removed from the axis of engine-rotation by an amount equal to one quarter of the stroke. The crank-shaft rotates about its own axis at twice the speed of the engine, but the axis of the crank-shaft remains stationary in space just as does the axis of the engine, although the two axes are eccentric to one another. It is sometimes a little difficult to see quite where this rotating engine obtains its abutment from a crank-shaft that also rotates in the same direction as itself; but some idea of the reaction in question can be obtained from a thoughtful study of our aforementioned diagrammatic sketch, especially if in the first instance no notice is taken of the gearing between the engine-casing and the crank-shaft. Our diagrammatic sketch serves very well for this purpose, and if the relative positions of the piston-rod and crank are closely observed, it will be found that the thrust applied along the piston-rod to the crank always produces a resultant of such a character as to create a torque-couple about the axis of the engine. In the Paradox motor there are four cylinders, and the second pair lie in a parallel plane to the first pair. They are placed at right angles to the first pair, but operate on a crank situated at 180° from the first crank.

Mention has already been made of one of the advantages claimed for the Paradox engine, and the other principal features that the inventor urges in its favour are the feasibility of using very long strokes and high-compression pressures. The engine designed for aeroplane use has a stroke of 7 ins. A long stroke in the Paradox type of engine does not involve any angularity of the connecting-rod, and consequently does not suffer from any drawbacks that may be associated with this feature in an ordinary engine.

The accompanying photographs and sectional drawing show the principal constructional features of the engine. So far as the photographs are concerned, the points of interest mainly relate to the use of skew-gearing for operating the cams and the magneto. The magneto, it may be remarked, is an 8-cylinder magneto, having four of the distributor-contacts coupled to false spark-gaps. The engine illustrated is a demonstration motor, and differs in some respects from the special aeroplane type illustrated by the sectional



Sectional drawing of the Paradox rotary engine for aeroplanes.

drawing. In this actual engine, for instance, the crank-shaft is overhung inside the crank-chamber, and an extension of the crank-shaft has been carried through the supporting-bracket on the left of the photograph that shows the engine in side view. It has a bore and stroke of 70 by 182 mm., and develops 25 h.p. at 1,400 r.p.m. In the aeroplane-type motor illustrated by the drawing the crank-shaft is supported at both ends and does not project.

The valves are operated by short cam-shafts that lie tangentially to the axis of engine rotation, and are operated by skew-gearing, as shown in the photograph. The large skew-gear wheel is stationary, and the small pinions rotate on their own axes as the engine revolves. The cams operate the valve push-rods through large bell-crank-levers, which are balanced by counterweights, but the balance is such that, without springs, the valves tend to open slightly by the action of centrifugal force. Induction and exhaust are effected through the hollow shafts upon which the engine is mounted, and the exhaust actually discharges through the boss of the propeller. Lubrication is assisted by a pump, but it will be noticed that practically all the bearings are ball-bearings.

The following are some of the principal data relating to the Paradox engine for aeroplanes:—Nominal h.p., 50; actual h.p. at 1,200 r.p.m., 60; bore, 4 ins.; stroke, 7 ins.; weight of engine complete, 220 lbs.; weight per h.p., 3.8 lbs. The cubic capacity of the cylinders is 4.6 litres, so that, approximately, the engine is rated at a fairly high value, for a rotary engine, of 11-h.p. per litre.

## IMPORTS AND EXPORTS, 1910.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

Imports.		Exports.		Re-Exportation.	
	£		£		£
January	2,516	January	750	January	550
February	437	February	2,950	February	—
March	7,516	March	128	March	600
April	6,305	April	950	April	1,470
May	846	May	400	May	350
June	7,961	June	642	June	558
July	11,608	July	336	July	830
August	6,188	August	812	August	1,455
September	1,034	September	4,340	September	1,668
October	2,816	October	670	October	2,211
10 months...	47,227	10 months ..	11,978	10 months...	9,692

## FLIGHT PIONEERS.

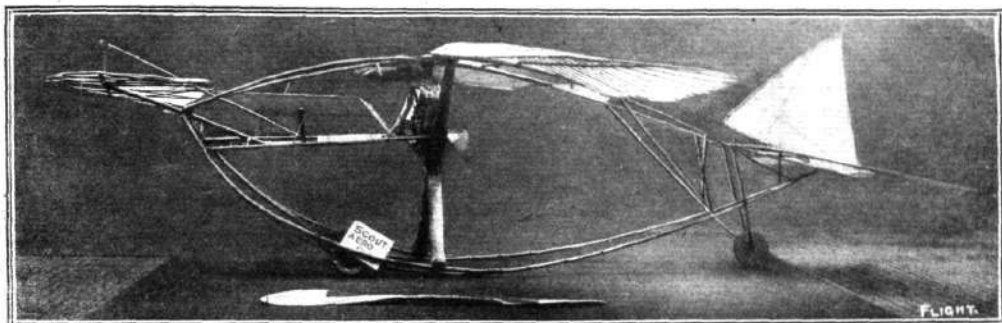
Full page Portraits which have appeared in "Flight." Most copies can still be obtained from the Publishers, 44, St. Martin's Lane, W.C., for 1½d. each.

1909.		1910.	
S. F. Cody	Sept. 18	Capt. Bertram Dickson	July 16
J. T. C. Moore-Brabazon	Nov. 6	Hon. Alan Boyle	" 23
The late Hon. C. S. Rolls	" 13	J. Armstrong Drexel	" 30
Frank McClean	Dec. 18	Lancelot D. Gibbs	Aug. 13
	1910.	James Radley	" 20
Roger W. Wallace	Jan. 1	John B. Moisant	" 27
Mortimer Singer	" 15	J. W. Dunne	Sept. 3
Louis Paulhan	" 22	Alec Ogilvie	" 10
A. V. Roe	" 27	Robert Loraine	" 17
Henry Farman	Feb. 12	G. A. Barnes	" 24
Hiram S. Maxim	Mar. 12	Emile Ladougue	Oct. 15
Claude Grahame-White	April 30	M. A. Clement	" 22
Cecil Grace	" 9	D. Graham-Gilmour	" 29

## AEROPLANES AT THE STANLEY SHOW.

ONLY two actual aeroplanes and one teaching machine are exhibited at this year's Stanley Show. One aerial engine, an

wooden fuselage resembles the type made popular by M. Blériot. The two wings have a bearing-surface of 75 sq. ft., and are placed



Major Baden-Powell's monoplaner at the Stanley Show, as seen from the side.

"Flight" Copyright.

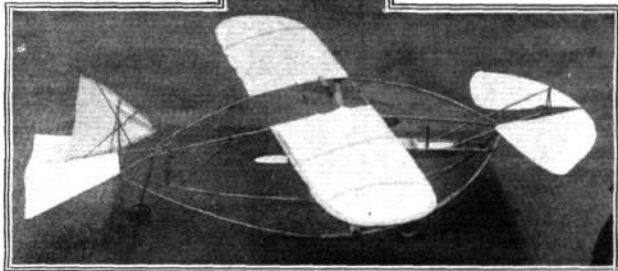
8-cyl. air-cooled J.A.P. of 40-h.p., is shown on the stand of a motor cycle firm.

Major Baden-Powell's machine is of monoplaner form, with a forward elevator and a fixed non-lifting stabilising tail. With the exception of the main frame of American elm, holding the engine and giving rigidity generally, the framework is constructed entirely of bamboo. The lower members of the fuselage act as skids, each being divided into two at the point of contact with the ground. In these two divisions are placed wheels working on spiral springs. The main planes, with an area of 90 sq. ft., are similar in shape to the wings of a bird, and are of Pegamoid stretched over a bamboo framework. The forward elevator, which is similarly constructed, is hinged to the forward point of the fuselage by a single steel clip, and is operated by a single control lever in front of the pilot. The rudder is of triangular shape, and is placed over the tail. No steering control is shown, but it no doubt would be by means of a foot lever. The pilot sits in a hammock-like seat in front of the main planes, whilst behind him and underneath the planes is the engine and propeller. The motor is a 12-h.p. 3-cyl. Buchet, and the propeller, which is mounted on the crank-shaft, is of original design, 5½ ft. in diameter. A general note of lightness is to be observed. The total stated weight of the machine complete with the aviator aboard is only 350 lbs. The price is low, £120. Major Baden-Powell tells us certain slight alterations will be made before testing the aeroplane.

The Steward monoplaner shown by the Scout Aero Club is superficially of conventional design but of very small size. The width is only 16 ft., and the length overall 15 ft. The

at a pronounced angle of inclination. Behind a fixed non-lifting tail plane is a cruciform tail of Demoiselle type pivoted to the fuselage. Lateral stability is maintained by trailing edge wheel and which a sideways

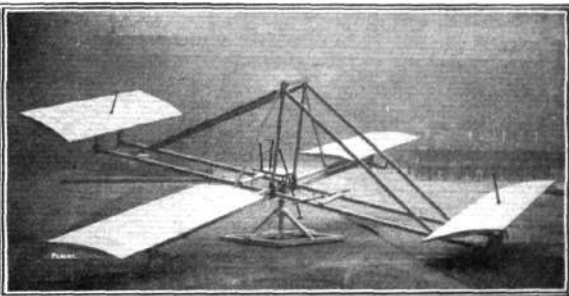
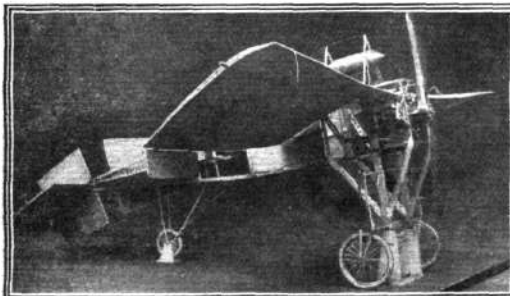
Behind a fixed non-lifting tail plane is a cruciform tail of Demoiselle type pivoted to the fuselage. Lateral stability is maintained by trailing edge wheel and which a sideways



"Flight" Copyright.

Plan View of Major Baden-Powell's Monoplaner at the Stanley Show.— Above the exhibit, it will be noticed, is placed a model of a bird.

The rudder is moved by a foot-lever. An Alvaston 20-h.p. 2-cyl. water-cooled engine is fitted, driving a small wooden propeller.



"Flight" Copyright.

**AT THE STANLEY SHOW.**—On the left is seen the Steward monoplaner, which, it will be noticed, has hinged ailerons fitted to the trailing edges of the main plane. On the right is seen the machine designed by Mr. Eardley Billings for teaching pupils the essential points in regard to the manipulation of an aeroplane. It was shown by Mr. Charles Lane. This was also illustrated in *FLIGHT* some months ago.

# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 15th inst., when there were present:—Mr. R. W. Wallace, K.C. (in the Chair), Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. John Dunville, Col. H. C. L. Holden, R.A., F.R.S., Prof. A. K. Huntington, Mr. J. T. C. Moore-Brabazon, Mr. C. F. Pollock, Mr. Stanley Spooner, and Harold E. Perrin, Secretary.

**New Members.**—The following new members were elected:—

Mrs. Ellen S. Blount. Cyril H. Mocatta.  
Capt. Hugh Constable Hall.

**Aviators' Certificates.**—The following Aviators' Certificates were granted:—

26. C. H. Greswell.
27. Capt. J. D. B. Fulton, R.F.A.
28. L. F. Macdonald.
29. Lt. R. T. Snowden-Smith.

**Rolls Memorial Library.**—The following sub-committee has been appointed to supervise the collection of aeronautical works:—Sir David L. Salomons, Bart., C. G. Grey, Prof. A. K. Huntington, V. Ker-Seymer, and Stanley Spooner.

## New York Aviation Meeting.

### Protest by the Royal Aero Club.

The Committee considered correspondence from Mr. Claude Grahame-White with reference to the protest made by him to the Aero Club of America against its decision in awarding the Statue of Liberty Prize to Mr. J. B. Moisant.

The Committee took note of the following:—

1. That the rules governing the Statue of Liberty Prize (£2,000) stipulate that "The prize shall be open to all aviators who shall have remained in the air in one continuous flight one hour or more, during the previous contests in the International Aviation Tournament."

2. That, according to information submitted, Mr. Moisant had not qualified by any previous continuous flight of one hour, and was therefore not entitled to compete for the prize.

3. That, according to information received, Mr. Claude Grahame-White had qualified by a previous continuous flight of one hour, and was the only qualified competitor who covered the course.

The Committee unanimously decided to lodge a protest with the Fédération Aéronautique Internationale against the award of the prize to Mr. Moisant and to put forward the claim that the prize should be awarded to Mr. Claude Grahame-White.

The Secretary was directed to cable the Committee's decision to the Aero Club of America, and to take the necessary steps for the convening of a meeting of the Fédération to consider the protest.

## Rolls Memorial Fund.

Members who have not yet sent in their contributions to the above Fund are requested to do so as early as possible. By limiting individual subscriptions to the sum of 10s. the Committee hope they will receive the support of all members.

It has been decided that the Memorial shall take the form of a bas-relief plaque, and that any surplus over and above the cost of the Memorial shall be devoted to the establishment of an **Aeronautical Library at the Royal Aero Club**, to be called the "Rolls Memorial Library."

Contributions of books to the "Rolls Memorial Library" will also be greatly appreciated.

A list of subscriptions received to the 9th November was published in the last issue, and the following have since contributed up to the 16th November, 1910:—

Claude A. Bettington, Kempton Cannon, W. H. F. Thomson, James Valentine, and Roger W. Wallace, K.C. *Per Aero Club de France*: Count de Castillon de Saint-Victor, Paul Tissandier, Henry Kapferer, Ernest Zens, Géo. Tharel, Charles Jambon, and Marquis de Kergariou.

## Library.

Dr. W. J. S. Lockyer has kindly presented to the Rolls Memorial Library a copy of his book, "Southern Hemisphere Surface-Air Circulation."

## Baron de Forest £4,000 Prize.

Intending competitors are reminded that it is necessary to give one month's formal notice of entry, and that the competition closes on December 31st, 1910.

## Aviators' Certificates.

The Royal Aero Club of the United Kingdom will grant certificates in accordance with the rules of the Fédération Aéronautique Internationale to aviators who have complied with the following rules, which will be in force until February 15th, 1911:—

### RULES.

1. Three separate flights must be made, each of 3 miles round a circular course without coming to the ground. These flights need not necessarily be made on the same day. On the completion of each flight the engine must be stopped in the air, and a landing effected within 150 yards of a given spot previously designated by the candidate to the Official Observers.

2. Each of the three trials must be vouched for by officials appointed by the Royal Aero Club, and a certificate obtained for each flight. All trials to be under the control of, and in places agreed to by, the Royal Aero Club.

3. Before being allowed to compete for certificates, candidates must, if called upon, satisfy the Committee of the Royal Aero Club of their ability to fly 500 yards, and of making a gliding descent with the engine stopped.

4. All attempts must be made between sunrise and sunset, and suitable previous notice must be given to the Secretary of the Royal Aero Club.

5. The Royal Aero Club declines all responsibility for any accidents, or any damage that may occur to the aviators, their machines, or to any third parties during or in connection with the qualifying tests of the candidate.

6. Candidates desirous of qualifying for certificates must make application on a form provided for that purpose. Expenses incurred, if any, must be borne by the candidates.

7. The Committee of the Royal Aero Club will decide if the candidate has qualified for a certificate, but reserves the right to refuse the same or withdraw the same at any time without giving reasons.

8. Foreigners belonging to a country represented on the Fédération Aéronautique Internationale can only receive a certificate from the Royal Aero Club after having obtained the consent of their national sporting authority, as approved by the Fédération Aéronautique Internationale. A certificate may be granted to a foreigner whose country is not represented on the Fédération Aéronautique Internationale.

9. The decision of the Committee of the Royal Aero Club in all matters connected with the trials is final and without appeal.

10. The Committee of the Royal Aero Club may in special cases waive any or all of the above rules, and grant certificates at its discretion.

## Eastchurch Flying Ground.

For the convenience of Members, the best train is the 9.45 a.m. from Victoria, arriving at Queenborough 10.55. At Queenborough change to the Sheppey Light Railway for Eastchurch, which is ½-mile from the flying ground.

**Railway Arrangements.**—The following reduced fares have been arranged with the railway company for members visiting Eastchurch:—

1st Class return, 8s.; 2nd Class, 6s. 6d.; 3rd Class, 5s.

Tickets available for one month from date of issue.

Members desiring to avail themselves of these reduced fares are required to produce vouchers at the booking offices. Vouchers can be obtained from the Secretary of the Royal Aero Club. Trains leave Victoria, Holborn, or St. Paul's.

Members visiting the flying ground at Eastchurch are requested to have with them their membership cards, as admission to the ground can only be obtained on production of same.

Members wishing to erect sheds are requested to communicate with the Secretary of the Royal Aero Club.

## Aviation Lantern Slides.

The Royal Aero Club have now acquired a large collection of lantern slides dealing with aviation, and members can hire these at a fee of £1 1s. for a period not exceeding three days. They include all the latest machines and pictures taken at aviation meetings in England and abroad. Application for hire should be made to the secretary.

HAROLD E. PERRIN,  
Secretary.

166, Piccadilly.



## PROGRESS OF FLIGHT ABOUT THE COUNTRY.

**NOTE.**—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.)

### A Model Making Club at Peckham.

MR. L. BROUGH, president of a model aero club at Peckham (81, Lyndhurst Road), informs us that the club is in need of new members. The entrance and subscription fees are both low, and a new workshop has lately been acquired. The club, which is now about five months old, is devoted to the study of aeronautical science, and the manufacture and flying of models and kites.

### A Model Aero Club for Redditch.

MR. F. DUGGINS, of 130, Beoley Road, Redditch, suggests that it might be possible to form a model aero club in the district, as there is not a club within a reasonable distance. Mr. Duggins would be pleased if those interested in this proposal would communicate with him.

### Arundel House School Ae.C. (15, ARLINGTON ROAD, SURBITON).

ON Saturday, November 12th, a kite-flying contest for the members of the Junior Branch was held in Hampton Court Park, a special permit from the authorities having been obtained for the occasion. There were eight competitors, but owing to the light wind, several of these were unable to raise their kites to the required elevation. Mr. Wilfrid L. Evershed, late of the Aeronautical Institute, who has judged for the club on former occasions, again kindly officiated in that capacity. The tests imposed were angle of cord, stability, weight-lifting and altitude, and in view of the unfavourable circumstances, the results were decidedly satisfactory. The first prize was awarded to N. Whitechurch, whose "Scarf" kite obtained 31 points out of 32. This kite was the only one that remained aloft during the whole of the time. Ralph Griffiths, the club's youngest member, took the second prize with 28 points, and it is worth noting that the line of his "Brookite" for some time attained an angle of 65°. R. F. Mann and other members of the club committee rendered valuable service in keeping the ground clear of too enthusiastic spectators, whose presence would otherwise have been a considerable hindrance to the competitors. The thanks of the club are also due to E. Aukland, Esq., one of the hon. vice-presidents, who kindly provided prizes to the value of 15s. for this competition.

Through the generosity of a local landowner, the club has recently acquired the exclusive use of a private "aerodrome," 400 yards by 300 yards, the ground being absolutely level and clear of trees. This is a great acquisition for the model-makers, and long flights are expected in the immediate future.

### Birmingham Aero Club (165, HAMPTON STREET).

ANOTHER "Cross-water" Competition for models has been arranged for Tuesday, December 27th, at 11 a.m., at the Edgbaston Reservoir. Cash prize, £5; distance, 187 yards. Should weather prevent the competition taking place competitors will be notified and their entrance fees returned beforehand.

No entries will be received on any account later than noon, December 12th. Also no inquiries will be replied to unless accompanied by a stamp.

A gliding ground with a suitable hill having at last been found at Edgbaston, Mr. F. Hill and a party are constructing a glider after the pattern of a model of his own design, which possesses very remarkable powers of flight and stability. Mr. G. H. Wood and another party are also engaged on a glider.

The hon. treasurer, Mr. R. Platts, has given to the club the materials for building a novel type of monoplane that will fly successfully when driven with a very low-powered engine. Those members most active in its construction will have the priority of using it when finished.

### Bristol and West of England Ae.C. (STAR LIFE BLDGS., BRISTOL)

A LARGE number of members of the club have been rendering valuable assistance in connection with the flights with Bristol biplanes over Durdham Downs, and these demonstrations have given great impetus to aviation in the district.

The glider which has been presented to the club by the British and Colonial Aeroplane Co., Ltd., is now complete, as well as the shed in which it will be kept. It is hoped that by the end of the month all arrangements will be made to enable members to commence gliding. The ground is situated near Keynsham, about five miles from the Bristol tramway terminus. A course of five lectures has been arranged to be given at the Merchant Venturers' Technical College, the first on "Modern Aeroplanes," by Mr. A. R. Lowe, to be given on Wednesday next, the 23rd inst. The other four are as follows:—December 7th, "The Sustentation and

Evolution of Flying Machines," by Mr. L. Blin Desbleds; January 18th, "Flying Machine Motors," by Prof. W. Morgan; February 15th, "The Coming of the Aeroplane," by Mr. E. S. Bruce; March 8th, "Vertical Flight and Reduced Horse-Power," by Mr. Joseph Clarkson. Members have the opportunity of attending these lectures without charge. The club room is open to members and their friends every night in the week, but Thursday has been set apart for the special club night.

### Conisborough and District Model Ae. Soc. (18, CHURCH ST.).

AN aero library has now been started, and all books relating to aviation will be gladly received. Such books as "Artificial and Natural Flight" by Sir Hiram Maxim, members now have the advantage of reading free of charge. The library also includes all the monthly and weekly papers and magazines on aviation, including FLIGHT.

### Doncaster Model Aero Club.

THIS club has now started on a very promising career, and is fully justifying the expectations of its founders. Among the members recently elected are three ladies. Four prizes have been offered, and there is every prospect of keen competition for them.

### East London Aero Club (37, TUNMARSH LANE, PLAISTOW, E.).

THIS club has been successfully inaugurated with the object of advancing the science and sport of aviation in the district of East London.

A series of lectures by eminent authorities upon the subject is being prepared for the coming session, and the acquisition of a workshop is being arranged for, where every facility will be accorded to members to construct models and gliders.

The joining fees are moderate and prospective members should apply to Ernest Sissons, hon. secretary, at above address for fuller particulars.

### Kensington Aero Club (4, ANGOLA MEWS, N. KENSINGTON).

A PRELIMINARY meeting of the Kensington Aero Club was held on the 2nd inst. and was fairly well attended. Mr. P. L. Senecal, who presided, explained the difficulties of forming and keeping up an aero club. A full sized glider is being constructed by one of the members, who is also experimenting with a steam plant for an aeroplane. It is proposed to investigate the subject of the helicopter and other advanced stages of aeronautics. The subscription will be moderate and within the limits of the working man. Intending members should communicate with L. Le Senecal, 4, Angola Mews, N. Kensington.

### Kite and Model Aeroplane Assoc. (27, VICTORY RD., WIMBLEDON)

THE next meeting of this Association will be held on the 28th inst., when a paper will be read by Mr. A. G. Thurston on the "Stability of Model Aeroplanes and Gliders." The paper by Major Baden-Powell on the "Theory and Practice of Kites" has been fixed for December 12th. By permission of the Aeronautical Society these meetings will be held at 53, Victoria Street, Westminster.

### Paddington and Districts Aero Club (2, EDBROOKE ROAD, W.).

THE attention of readers residing in London is called to the above club's propaganda for the coming winter, and the facilities the club offers to intending members. The workshops of the club are central in a district handy for all to reach. Lectures, illustrated by cinematograph films, by Mr. Handley Page and Mr. G. P. Deverall-Saul have been arranged to take place during the year. In the shops, members may work independently or together, or they may form one of the many topic classes now being arranged upon different subjects.

### Yorkshire Ae.C. (Model Section) (HOTEL METROPOLE, LEEDS).

AN informal flying meeting was held on Saturday afternoon, 12th inst., at the Drill Hall, Carlton Hill. Of the dozen models which made their appearance, the majority appeared to suffer from "stage fright," the afternoon's flying being rather poor. Will members please note that the club has now at Carlton Hill a splendid model flying ground, nearly 500 yards long. It is within a few minutes of the city. Competition flying will take place every Saturday afternoon from 2.30 p.m., weather permitting, and all members possessing flying models are invited to bring them along. All communications re this section to St. W. Fitzgerald, hon. secretary.

## FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Ground, Eastchurch.

THE weather here during the past week has been very squally, but the short spells experienced in which it was at all possible to venture out have been taken full advantage of by Mr. McClean on his Gnome-engined "Short" biplane.

On Wednesday, the 9th inst., he brought out this machine, and despite a stiff breeze immediately rose to about 100 ft. He was content, on this occasion, to remain within the immediate vicinity of the grounds, flying in circles and figure eights and executing several successful *volé plans*, at which, by the way, he is becoming quite an adept. One of these exhibitions was particularly clean, the machine approaching to within 15-20 ft. of the ground before the engine was re-started. Later in the day Mr. McClean was again seen to advantage, on this occasion making several short trips carrying a lady passenger.

On Thursday, the 10th, Mr. McClean again brought out his machine and made a splendid flight of over an hour's duration. He frequently passed over Hartly and the surrounding country, returning each time along the coast line, and ultimately effecting a good landing from a steady *vol plané* of some 150 ft.

Friday was an impossible day, but on Saturday Mr. McClean beat all his previous performances by remaining aloft for well over an hour and a quarter. His journeys on this occasion extended over Hartly and Shellbeach on the one side, and Queenborough and Sheerness on the other.

Mr. McClean's performances this season have been consistently good, and his total mileage since July now stands well over 600. His machine has behaved splendidly, and has not given the slightest trouble since leaving the works.

Mr. Jezi was out for some time on Saturday on his biplane testing the efficiency of the power plant in its new position, this having recently been altered to the front of the machine. Mr. Grace is trying a similar experiment on one of his "Short" biplanes, and we shall hope to give some particulars of the trials of both these machines, which will be held during the next week if weather conditions are favourable, in our next issue.

Sunday and Monday were blank days, the weather being wretched.

On Tuesday, the 15th inst., Mr. McClean brought out his latest



Mr. Frank K. McClean and his first passenger, Dr. William J. S. Lockyer, with whom, on his Short biplane, he flew on October 22nd at the Royal Aero Club grounds at Eastchurch, Sheppey. Mr. McClean has been, as we record, making some splendid cross-country flights, one lasting for 1 hr. 6 mins.

"Short" biplane. This is on the lines of the Farman, but embodies all the original features of Short Bros' productions. The machine was only completed on Monday, but after devoting about half-an-hour to the tuning up of its Gnome engine, Mr. McClean essayed a short trial. She rose at the first attempt in about 100 yards or so, and flying at about 50 ft. Mr. McClean completed several circuits before bringing her down. After lunch Mr. McClean was quickly off the mark, rising sharply to a height of some 150 ft. Keeping at this altitude he completed eight or nine circuits of the ground in good time, when he landed for a few further adjustments to the engine. Shortly afterwards he made a further flight, and this time gave a good exhibition of "planing." These three flights represented a total of some three minutes short of the hour—not bad for the first spin. The machine rides the wind beautifully, answers to the helm readily, and from all appearances will develop a good turn of speed when the engine is thoroughly tuned up.

### Brooklands Aerodrome.

BAD weather and a dearth of smashes makes little to record at Brooklands this week. The aviators here, with only one or two exceptions, notably Mr. Gilmour, seldom go beyond the confines of the track, so that, unless an airman is competing for his certificate, circling the aerodrome provides little excitement.

Four new flyers tried for and three obtained their pilot's certificate this week, Mr. Macdonald and Mr. Low, both on the Bristol-Gnome, Lieut. R. T. S. Smith on M. Blondeau's Farman, and Mr. Greswell on the Grahame-White School Farman (British built). This latter is now fitted with the larger size E.N.V. engine, and pulls well. Mr. Greswell, on his qualifying flights, encountered some very treacherous puffs of wind.

The Spencer-Stirling machine, on Wednesday, the 9th, was out in the morning making very promising straight flights, and again later on at dusk. Mr. Sopwith, on the Howard-Wright monoplane, and Mr. Low, on the Bristol-Gnome, were making circular flights. M. Blondeau was also flying with a pupil, and Mr. Greswell, on the Grahame-White Farman, was doing well.

Thursday, Mr. Sopwith and Mr. Greswell were again flying, the latter attaining quite an altitude—something between 200 and 300 ft., high flying for a novice. He put in his qualifying flights for his brevet. Friday, except for the Bristol-Gnome, proved a *des non* from the aviation point of view.

Saturday saw more flying, although nothing of a sensational nature. Three aviators qualified for their certificates, Mr. Low being unable to complete owing to darkness. Lieut. R. T. S. Smith, who has been taught by Blondeau, had only fourteen lessons, and never had a smash.

Sunday, a blank day, owing to the weather; and the early part of this week was little better, only M. Blondeau and Mr. Watkins, who is doing remarkably well on his Howard-Wright monoplane, braving the mud and elements.

It is rumoured that the monoplane, known locally as the "Elephant," namely, Mr. Jack Humphrey's large surface machine, is to lose its place of honour as the biggest machine here, in favour of an enormous biplane of novel design which is rapidly nearing completion.

The Alexander engine tests are being seriously discussed in the aviators' meeting-place "The Blue Bird." The failure of the British engines on this important test is a matter of vital interest to the average British flyer, especially when we see the number of British engines at Brooklands gradually diminishing and Gnoms taking their place.

### Dunstable Park.

ON Saturday, November 5th, Mr. Holder brought out his Humber Blériot, and after numerous attempts to keep the machine on an even keel, discovered that the wire round his wing-warping pulley underneath the body had come unsoldered, allowing the wings to warp as they thought fit. Later in the day, after repairs had been effected, he made a number of short flights.

On Monday, the 7th, Mr. Seddon brought out his huge tandem biplane for the first time for a run along the ground. The weight of the machine, however (which is somewhere between 20 and 30 cwt.), proved too much for the axle of the right wheel, which gave way under the load. This machine, which, it will be remembered, is fitted with two N.E.C. engines of 50-60 h.p. each and Beedle propellers, showed good acceleration powers in the short run before the collapse, but a speed sufficient to lift the machine was not attained. The stationary pull of the two propellers is something over 600 lbs. These are not in any way connected together, and both engines have to be run up to a certain speed and kept in unison. The machine in its short run turned considerably from the straight path, presumably from this reason. It is, however, we believe, Mr. Seddon's intention to connect both engines by a chain.

Mr. G. E. Bradshaw brought out the Star, fitted with the new Star engine, for the first time on Thursday, the 10th, and making a number of flights found the machine even steadier than before. The Star monoplane was always a steady flyer, but the tail had too much weight on it, and dropped a little when in flight. The new engine, which is slightly heavier, seems to make the machine travel on a more even keel, and the pilot says it is hardly necessary to move the elevator at all. The long tubular Autojet pattern radiator has been replaced by a small neat looking one behind the engine, and this latter is so efficient that after half-an-hour's run on full throttle in the shed, the hand could be held on the water-pipe above the engine without discomfort. Mr. Bradshaw was out again for a considerable time on Friday afternoon, the 11th, but a nasty sidewind over the trees prevented anything but straight flights.

The Mann monoplane is awaiting a new and larger propeller for the Jap engine with which it is fitted. The engine turns the present 6-foot propeller at 1,500 revolutions per minute, and Mr. Mann thinks he will get a greater pull from a seven-footer running at about 1,200 revolutions per minute.

Mr. N. F. Holder has decided to dispose of his present monoplane, and has placed an order with the Blériot firm for a two-seater Blériot monoplane driven by a 40-h.p. Gnome engine.

The Star biplane, built on Farman lines, is now, we learn, completed, and will be taken to the flying sheds in the course of the week for its trial flights.

#### London Aerodrome.

THE past week has been a scene of great activity in the Blériot school. On Tuesday, the 8th inst., Mr. Johnstone, one of the American pupils of the school, was out practising, and managed to

get off the ground. It was, however, only his second lesson, and, being inexperienced, he descended somewhat violently, breaking a wing. On Wednesday, Prier was at work, and flew with his usual brilliancy. Next day two new pupils signed on, Mr. Bouwens and Capt. Board, each taking their first lesson on that date. On Friday Mr. Bouwens had his second lesson, and progressed fairly well. On Saturday morning Mr. Weir was out, and met with his first accident; his machine, fitted with a 25 h.p. Anzani, got a little out of control, with the result that the front chassis-struts were cracked. His luck so far has been marvellous. Using the other school machine, Mr. Bouwens indulged in a third lesson, and, as a result, left the ground, and made several low flights of about 300 yds. In the last of these he went dangerously near to the boundary-fence, but by dexterous manipulation he steered himself clear in a masterly manner considering his inexperience. In the afternoon Prier made a flight of about half-an-hour, ascending about 300 ft., and displaying all his old skill. It is really difficult to quite adequately describe all Prier's flights. Only those who see them can note the wonderful evolutions between one flight and another; in cold type they all read the same.

During this week the Valkyrie people have not enjoyed the best of luck. The little machine was hushed on Tuesday, but owing to the breaking of a pump and propeller troubles, the "Valkyrie III" could not get out until Friday, which was a day hardly suited to trying a brand-new and untried aeroplane. On Saturday, however, the pilot made two good flights—one of three complete circuits of the ground and another of two and a half rounds, at an average height of some 30 ft. from the ground. On Monday he was out again, but was not doing quite so well as on Saturday.

A new machine—the Pupin monoplane—arrived on the ground last Friday, but has not yet been out of its shed.

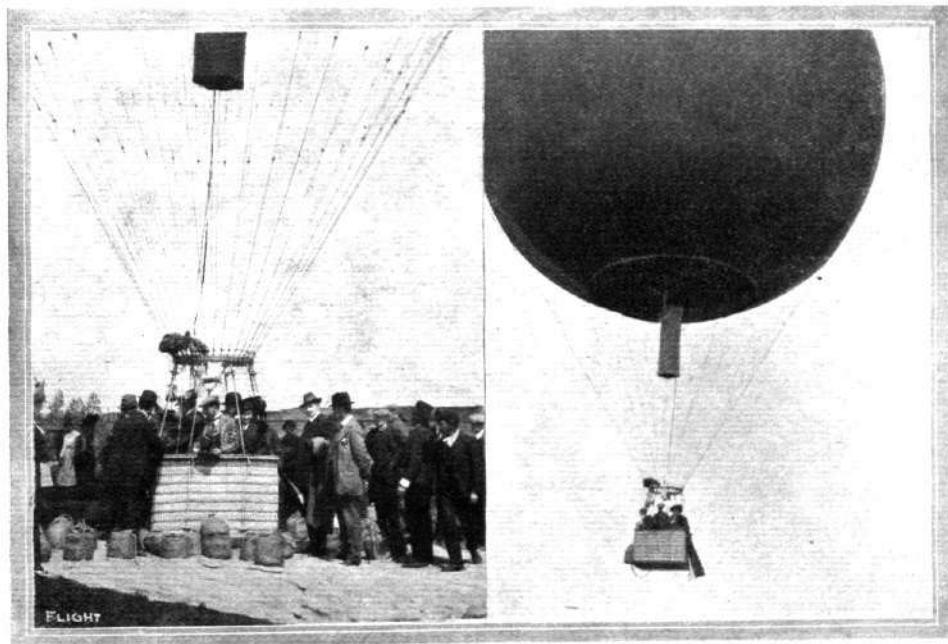


## AIRSHIP AND BALLOON NEWS.

#### The Willows Airship in France.

On the 10th inst. the Willows airship arrived at Lamotte Beuilly, where it was safely housed in the shed there belonging to M. Adolphe

Clement, where the necessary repairs were carried out, and Mr. Willows hoped to have the airship ready for a cruise over Paris during this week.

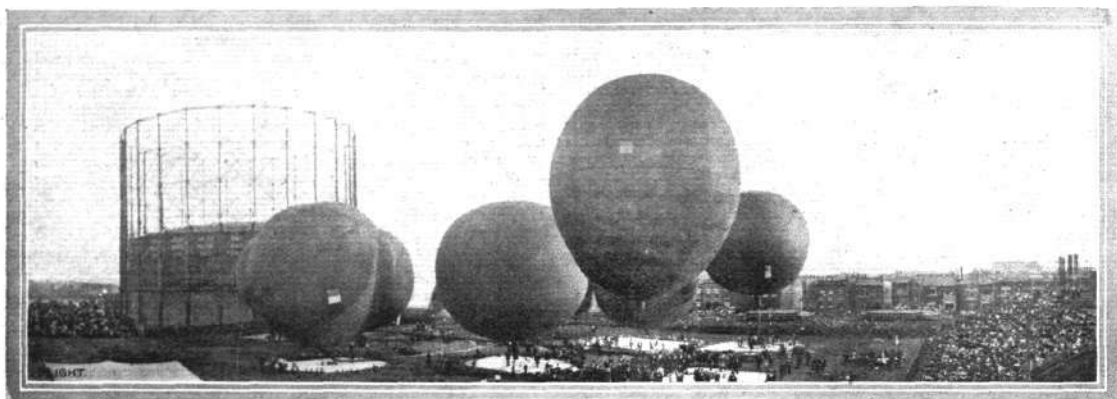


Ready

and

Away.

A BRITISH BALLOON ASCENT IN CHILL—From Mr. J. Norton Griffiths we have received the two very interesting photographs of the first balloon ascent made with his balloon at Santiago, Chili. The occupants of the car were Mr. Short of London, Senor Don Mateo Clark and Miss Clark, and Senor H. Gana. The balloon was sent over in charge of Mr. Short to take part in the Chili Centenary Celebrations last September.



**INTERNATIONAL BALLOON RACE IN AMERICA FOR THE GORDON-BENNETT BALLOON CUP.**—The start from St. Louis on October 17th. This race, it will be remembered, was won this year by the "America II," with Mr. Allan R. Hawley and Mr. Augustus Post as crew, a new world's record for distance also being claimed.

#### French Customs and the Willows Airship.

As we announced in our last issue, following upon the representations made by the Aero Club of France, the French Director of Customs gave orders that the Willows airship should be released upon Mr. Willows giving an undertaking that in the event of his airship remaining definitely in France he would pay the proper Customs dues. The airship will be allowed to remain in France free of duty for one month. In view of the trouble experienced by Mr. Willows in this connection, it would be well for those who contemplate following his example to give notice of their intentions to the French authorities, so that the proper notification can be sent to the Excise officers.

#### "Parseval V" in Trouble.

HAVING been sent by rail to Brunswick, "Parseval V" was inflated on the morning of Sunday week. During the afternoon of

that day she made five trips of varying duration, and was then moored on the military parade ground for the night. A storm suddenly broke over the ground and it being feared that the airship would break away from her moorings the envelope had to be carefully deflated. While this operation was being carried out in the storm, the framework of the car sustained some damage. She was therefore packed up and sent to Bitterfeld to be repaired.

#### Two "Zodiacs" for Russia.

ACCOMPANIED by a staff of mechanics, &c., Count de la Vaulx is making a visit to Russia in connection with the two dirigibles which have been ordered from the Zodiac firm by the Russian Government. The two airships, which are of 2,200 cubic metres capacity each, will be stationed at the fortress of Brest-Litowski.

## BRITISH NOTES OF THE WEEK.

#### Flying at Bristol.

STARTING on Friday afternoon of last week a fine series of flights were carried out at Bristol by the machines built by the British and Colonial Aeroplane Co. On Friday evening, although a heavy rain was falling, Mr. Macdonald brought out one of the machines from the shed which has been erected on the Sea-walls Plateau at Durdham Downs and made three short flights in a straight line, the last one accompanied by a passenger. Mr. Jullerot then took charge of the machine and flew round the ground for a few minutes, after which the machine, having proved itself satisfactory, was returned to its shed for the night. Operations were commenced early on Saturday morning, when Mr. Jullerot set the ball rolling by taking Mr. Stanley White for a ten minute trip. The wind then freshened considerably, and it was decided to postpone further attempts until the afternoon. During the morning a large crowd of people wended their way out to the grounds to see the flying, and those who remained were not disappointed. At 3 o'clock Tetard took his seat on the machine, and as soon as the police had cleared a course for him started off. He steered for the sea walls and then took a wide sweep round the grounds in the direction of the reservoir. He afterwards started on another wide circle, after which he came to earth quite successfully. During the latter part of this flight it was evident that the wind was very trying, and he found it difficult to pass over the Avon Gorge. After this flight the weather conditions became worse, and it was eventually decided to abandon any further attempts for the day. Monday was a blank day on account of the wind; several distinguished visitors, however, inspected the machines in their sheds, including Mr. Birrell, the Secretary for Ireland. It had been hoped, too, that Mr. Haldane would have been able to see the machine flying, but he was detained by his other engagements.

#### The Havilland Aeroplane.

SOME very successful flights of long duration have, we learn, been made by Mr. G. de Havilland down at Newbury, and the

engine with its new nickel steel connecting-rods is apparently running with perfect consistency and regularity. On one occasion a continuous run of 40 mins. was made, and weather permitting Mr. de Havilland hopes to qualify for the Royal Aero Club certificate during next week. Considering the restricted nature of the trial ground, his progress has been remarkably good, rabbit warrens and railway lines not being by any means conducive to facilitate the acquirement of the art by any novice.

#### Mr. Cody has a Mishap.

DURING a trial flight on Saturday afternoon on his aeroplane over Laffan's Plain Mr. S. F. Cody, when making a sharp turn, failed to notice a telegraph wire. This caught one of the planes and turned the machine broadside to the direction in which it had been travelling, its speed having been about 65 m.p.h. Though a perfectly level keel was maintained, the chassis was somewhat damaged in the sudden landing. After two hours' work in replacing three or four broken parts, however, Mr. Cody succeeded in flying back to his shed, a distance of a mile and a quarter, although he could only use one elevator.

#### The Rolls Memorial.

HAVING come to the conclusion that it would be inadvisable to erect memorial plaques in the new Club House in Pall Mall, the Executive Committee of the Royal Automobile Club have decided to put up a Roll of Honour Tablet instead and to hand over to the Royal Aero Club all subscriptions received by the R.A.C. for the Rolls Memorial Fund, to assist in the establishment of the Rolls Memorial Aeronautical Library.

#### Exeter and the "Daily Mail" Prize.

THE question of Exeter being one of the stopping-places in the great flight round Great Britain next year in connection with the *Daily Mail* £10,000 prize came before the City Council last week. One of the Aldermen thought there was no reason why the Council should take any part in forwarding the matter, and said it was a matter for personal attention and private arrangement. Several of



the more far-seeing Councillors, however, thought it should be encouraged as it would greatly benefit the trade and interests of the city. The Mayor was also of this opinion, and eventually it was left in his hands to take what action he thought fit.

#### Cross-Channel Flying.

IN view of the forthcoming attempt to win the Baron de Forest prize, Mr. Cecil Grace's machine is now housed in the shed erected by Mr. W. Harbrow at Dover. After the end of the year this shed may be hired by anyone who is intending to attempt a cross-Channel flight.

#### "Tellier" Monoplanes for England.

WE learn that Mr. D. Lawrence Santoni, who has obtained a concession for the rights of the "Tellier" monoplane in England, is anxious to find co-operation in connection with their building and introduction into this country and their establishment on the English market. Needless to say, the "Tellier" monoplane is not an untried machine; on the contrary, a very fair record of its performances is to be found in back numbers of this paper. Hence, home-built "Tellier" models are fairly certain to be in evidence on British aerodromes ere very long.

#### Materials for Model Making.

THIS is the title of a very complete catalogue issued by Messrs. T. W. K. Clarke and Co., and in it model makers will find prices for practically every conceivable fitting and material they are likely to want in connection with their hobby. Those building models would be well advised to send for a copy.

#### An Artistic Catalogue.

UP to the present, catalogues and price lists which have been issued by British firms connected with the flight industry have not been specially distinguished for the artistic treatment of their contents. A striking exception to this comes in the form of the latest list issued by C. Grahame-White and Co., under the title of "Everything Aviatc." This booklet gives particulars of Farman, Blériot, Avis, Antoinette and Tellier machines fitted with various engines, particulars of several types of engines and propellers, while at the end of the book is reproduced a clever caricature of Mr. Grahame-White by Mr. Charles Andrews. For this type of publication it is a distinct move in the right direction.

#### Another Burberry Book.

WE have received from Messrs. Burberrys, of the Haymarket, a copy of their annual contribution to the science of weatherproof



BRITISH REPRESENTATIVES IN THE INTERNATIONAL MEETING AT BELMONT PARK (N.Y.)—From left to right: Messrs. Alec Ogilvie, James Radley, Claude Grahame-White, and W. McArdle.

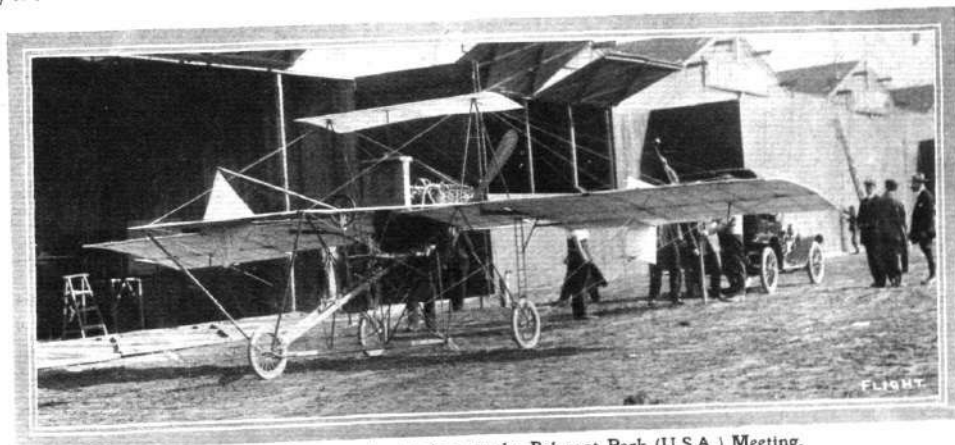
clothing or sport and out-door pastimes, including aviation. This costly volume, comprising 256 pages, is a highly creditable production, especially in regard to the series of illustrations; in fact their excellence makes one regret the signature of the clever artist is not more legible.

The get up throughout may be gauged by the artistic trade mark of the firm, which forms the ornamentation of the front cover, this being an accurate copy of a unique specimen in the Wallace collection of armour.

The letterpress is helped considerably by a large number of patterns of Burberry fabrics, in addition to the already mentioned drawings.

Although high quality is the firm's maxim, quite moderate charges, which are clearly stated, are in force.

Among the illustrations we notice special models of suits for aviators, in which the firm's object is to give the greatest warmth and perfect freedom combined with a thorough appreciation of the technical conditions of flying.



Glenn Curtiss' new racing biplane at the Belmont Park (U.S.A.) Meeting.

# FOREIGN AVIATION NEWS.

## Changes in the American Aero Club.

ACCORDING to a cable from New York, Mr. Alan A. Ryan was successful in the annual election of officers of the Aero Club of America, being elected president to succeed Mr. Cortlandt Field Bishop by a large majority.

## Five Persons on a Henry Farman Machine.

CONTINUING his series of experiments in connection with passenger transport, Mr. Henry Farman on Friday of last week succeeded in carrying four passengers beside himself on his biplane, one of the passengers weighing 91 kilogs. The total weight carried was 370 kilogs., made up as follows:—pilot, 67 kilogs., passengers, 91, 65, 62, and 51 kilogs. respectively, petrol, 22.5 kilogs.; and oil, 10.5 kilogs. On the previous day a similar performance was carried out, but then the total weight was only 354 kilogs., with which the machine flew quite satisfactorily for a distance of 20 kiloms.

## Flying Home from Aeroplane School.

HAVING completed his course of instruction at the Blériot School at Etampes, Eugene Duflot decided to fly back to his home at Vervins. Although there was a thick mist over the ground, he left Etampes on Saturday morning, but he had not proceeded far when he found he had lost his way. He therefore landed at the first convenient spot, which proved to be Aulnay-les-Bondy. Almost immediately afterwards he started again in the direction of Soissons, but when within 2 kiloms. of his destination, he was obliged to land in order to replenish his fuel tank, &c. This done he started off once more and soon reached his destination, the total distance covered during the journey being 200 kiloms.

## English Visitors at Buc.

ON Saturday afternoon among the visitors to the R.E.P. School at Buc were Vice-Consul Sir Henry Jackson, Captain Murray, R.N., Mr. Frank Barker, M. Clementel, and Lieut.-Col. Boutiaux. They witnessed several fine flights by Pierre Marie and Laurens, the former concluding one of his flights by gliding down from a height of 500 metres. M. Esnault-Pelterie afterwards conducted the visitors through his works.

## Aeroplanes to Assist Surveyors.

WITH reference to the note in last week's issue regarding the Blériot monoplane which is being sent to Persia to be used by a surveyor in the course of his duties, it is now announced that negotiations are in progress in Paris with a view to sending a monoplane out to South America. This it is proposed to use in connection with the surveying operations for a new railway, and it is believed that it will prove of great value to the surveyors in connection with their work.

## New Maurice Farman Military Pupils.

AMONG the latest four military officers to be nominated to receive instruction on the Maurice Farman biplane, one of them is Captain Evee, who, it will be remembered, has hitherto confined

his attentions to the Wright biplane, for which he has designed several modifications. The other officers are Capt. Taron, Meunier, and Lieut. Lucas, the last-mentioned also a Wright pilot.

## A Military Tellier Monoplane.

A TELLIER monoplane specially designed for military use has been tested recently at the school at Etampes. On Saturday afternoon, Chateau started off with the intention of flying over to Buc, but owing to the mist he was forced to land at Rambouillet.

## The First Japanese Pilot.

AMONG the last list of pilot-aviators, now passed by the Aero Club of France, was the first Japanese aviator to receive such a certificate. His name is Tokugawa Yoshitoochi, and the number of his certificate is 289.

## Paris to Brussels Flight.

LEGAGNEUX and Martinet have again been dogged by ill-fortune in their second attempt to win the Grand Prix of the Automobile Club of France for a passenger trip from Paris to Brussels and back. They started from Issy on Sunday morning, and the aviators reached Eterbeek, the flying ground near Brussels, safely, after making two stops en route at Compiègne and Bavay. The wind was favourable, and so the speed was very fast, the 280 kiloms. being covered in 3h. 38m. 5s. net running time. The two aviators intended to start on the return journey the same evening, but the wind rose and necessitated a postponement. On the following day the weather conditions were much worse, heavy rain falling and the wind being very violent. As there was no hope of the aviators being able to complete the return journey within the maximum time of 39 hours, they were reluctantly forced to abandon their attempt.

## Accident to a Belgian Aviator.

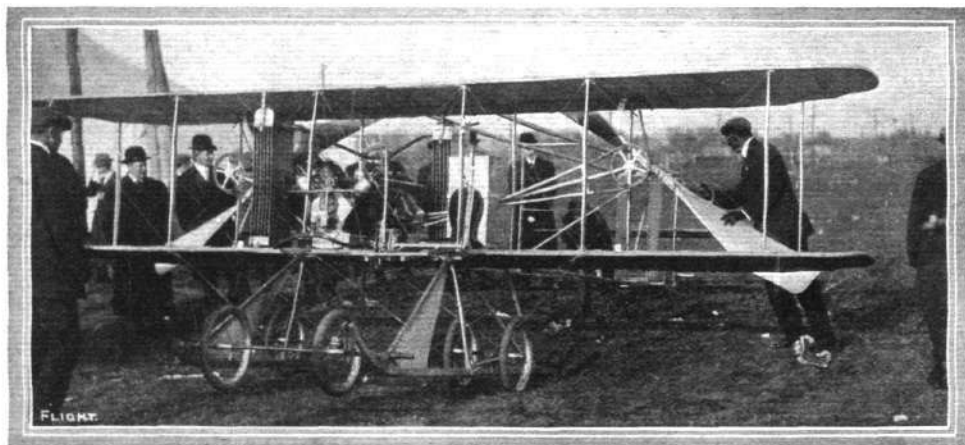
WHILE giving a series of demonstration flights with Louis Bathiat at Mouseron, the aviator, Peeters, was caught unexpectedly in a squall and fell to the ground from a considerable height. He was moved to a doctor's near by, and it was at first reported that he was dead, but happily this proved not to be the case, and the latest reports say that his injuries are not serious and he is well on the way to complete recovery.

## Count Zeppelin Offers a Prize.

IN connection with a cross-country flight from Ulm to Friedrichshafen, which is being organised in Germany, Count Zeppelin has promised to give a prize of 25,000 marks. The competition will be confined to German aviators and the first to enter are Jeannin, Wienziers and Grade.

## Prince and Princess Henry Flying.

NOT only is Prince Henry of Prussia rapidly qualifying as a pilot of the Euler biplane, but Princess Henry, no doubt encouraged by her husband's success, has also been flying with Herr Euler. On Sunday afternoon the Princess went for a trip of about 20 kiloms., during which the biplane soared to an altitude of 120 metres.



The new "Baby Wright" which made its first appearance at the Belmont Park (U.S.A.) International Meeting—and, it will be remembered, came to grief.

### Germany After Duration Record Honours.

AT the flying ground attached to the factory of the Aviatik Society at Habsheim, close to Mulhouse, Amerigo is actively training in preparation for an attempt to beat the world's duration record on an Aviatik biplane, which, it will be remembered, is a German-built copy of the Henry Farman. On Saturday evening he took the General-Commandant of the district for a 20 minutes' trip, and afterwards he was flying for 2 hours at an altitude of between 300 and 400 metres.

### Aeroplanes for the Austrian Army.

A NOTE from Vienna states that the Austrian Government have decided to order three home-built aeroplanes. Before being accepted the machines will be required to fly for two hours at an average speed of 44 miles an hour. They must also be capable of being taken to pieces and packed on a motor wagon within one hour and of being re-erected, in flying order, under two hours.

### An Austrian Officer Flies Across Country.

A FINE flight was accomplished by an Austrian officer, Captain Petroczy, on the 11th inst., when, mounted on a Pischoff monoplane, he flew over from Wiener-Neustadt to Ebergassing. The officer had intended to go to Fischemend, where the military dirigibles are installed, but was compelled to land 10 kilometres before reaching there owing to his motor stopping.

### Winnings at Baltimore.

THE most successful pilot at the meeting held last week at Baltimore, where the weather was very bad, was Latham, who won altogether £1,720, Drexel being next with £500, Jacques de Lesseps third with £250, and Hoxsey fourth with £200. At the close of the meeting Latham left for California, while De Lesseps crossed over to Canada. The longest flight during the meeting was Latham's 34 mins. 34 secs., while the highest was Drexel's 850 ft.

### Another American Prize.

AMONG the prizes recently offered in America for point-to-point flying is one of £1,000 put up by the *Havana Post* for an aeroplane flight between Havana and Key West. The distance is about 90 miles, and it is proposed to hold the event during the first week of December.

### Cattaneo in Argentina.

THE daring Italian Blériot pilot, Cattaneo, is being lionised in Argentina as a result of his great cross-country flights. On Saturday last he flew over from his flying ground at Villa Lugano to the race-course, where he descended just as the horses had passed the post in the Grand Prix. He was given a great reception by the 50,000 persons present, and the president of the Jockey Club pre-

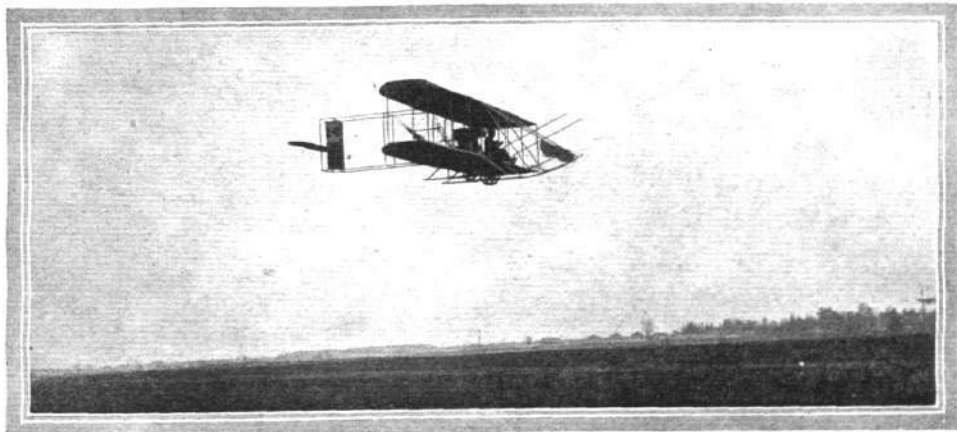


What is it? A wreck thrown up by the sea? A collapsed house, or what? Just the aeroplane "hangar" provided at the Baltimore (U.S.A.) aviation grounds after a night's "weather." Mr. R. J. H. Hooper, in sending us this unique photograph, writes: "The wreck of Radley's Blériot at the Baltimore Aviation Meeting. I took this on November 4th, the morning after a gale and snowstorm had brought down the large tent. Underneath the same tent were Drexel's Blériot, De Lesseps' Blériot, and Latham's Antoinette. We were first on the field, and cut away the tent before taking this photo. The other machines were still uncovered. The engine end of Latham's Antoinette is just visible beyond Radley's machine. Little wonder there is a reported loss of £8,000 on the meeting."

sented him with a special prize of £80. Later in the day he started up his machine, and flew across Buenos Ayres. On the previous Monday he was up for two hours, and passed over the city at a height of 2,000 metres.

### Flying from a Cruiser.

FOR some time Mr. McCurdy has been trying to make arrangements to fly on his Curtiss machine from an outgoing steamer back to New York, but so far has not been able to carry out the project. A fellow pilot, however, Mr. Eugene Ely, on Monday made a short experiment in Chesapeake Bay by flying from the deck of the U.S. cruiser "Birmingham," and landing on Willoughby Spit. Mr. Ely was forced to land somewhat sooner than he intended, as his propeller was damaged soon after starting owing to its striking the water.



Hoxsey, in his new type Wright biplane, travelling well in his start for the high altitude contest at Belmont Park (N.Y.).

## CORRESPONDENCE.

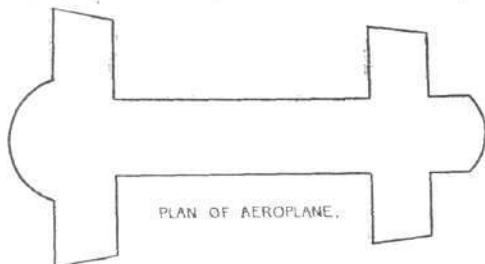
\*. \* The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which they have read in **FLIGHT**, would much facilitate ready reference by quoting the number of each such letter.

### AEROPLANES AND YACHTS, RE 818.

[893] Your interpretation of my last letter differs from what I intended to convey. In my actual letter I did not write "an aeroplane should—to be stable—have a greater chord than span," but "an aeroplane should—to be stable—be longer than it is broad," and I was referring not to the chord and span of the plane, but to the length and breadth of the whole machine. Your remarks, therefore, as to the lift of an end-on "plane" do not apply.

I send you a drawing of a design which I have found to be the best all round out of some 700 which I made and flew last year.



The front part, as you see, almost reproduces your T shape, and moves in its natural position—end on. I claim for this shape that:—

- (1) As it carries the weight under the planes, it is impossible for it to overturn.
- (2) Its lifting surfaces are so compact as to permit great strength of construction, and to avoid all wire bracing and such flimsy arrangements.
- (3) It has much less head resistance, surface for surface, than any other machine.
- (4) Consequently it can travel at a greater speed, and the planes have only a slight angle of incidence, resulting, of course, in still less resistance and still greater speed.
- (5) With great speed it is necessary to put the pilot under cover, and I therefore put pilot, engine, and all working arrangements into a boat-shaped car, which I am pleased to see you advocate as the shape of the future, but which I do not show as I am not artist enough to draw it.

Manchester Street.

W. LE MAÎTRE.

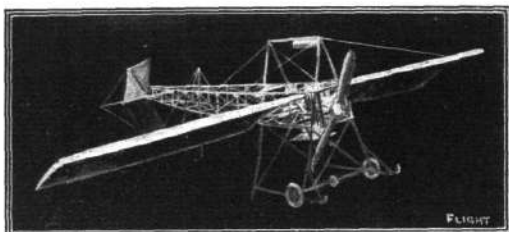
### THE C.R. MONOPLANE AND BIPLANE.

[894] In your paper of January 22nd and 29th you published a paper and photograph of a C.R. biplane, for which I was jointly responsible. I now enclose some photographs which I trust you will consider worthy of publication in **FLIGHT**.

One photograph shows the workshop where Mr. Chittenden and I made our machine, and which has since been used by us for the construction of the monoplane, a photograph of which is enclosed, the work being carried out in the name of A. W. Seymour, Motor and Aeronautical Engineers, Rugby. The other two photo-

graphs are of the C.R. biplane No. 2. This machine is very satisfactory, and although we have not actually made a flight with it, it has lifted about 18 ins. from the ground, and runs well. Unfortunately we are greatly handicapped by the limited space at our disposal. It is fitted with an Alvastron engine (water cooled) of 30 h.p. at 1,200 r.p.m., and a Weiss propeller, 7 ft. diameter, made by Messrs. Lascelles and Co., of London. The main planes are about 30 ft. across and 4 ft. deep.

The monoplane is fitted with a 40-h.p. Lascelles 4-cyl. air-cooled engine, and a 7 ft. diameter Weiss propeller made by the same company. It will be a favour if you will note that the biplane



The C.R. Monoplane.

was built and is owned by Mr. Chittenden and myself, whereas the monoplane was built by us in the name of A. W. Seymour, in which name we hope to continue the business.

Chiswick.

LESLIE H. ROBINSON.

### DIHEDRAL AND PENDULUM.

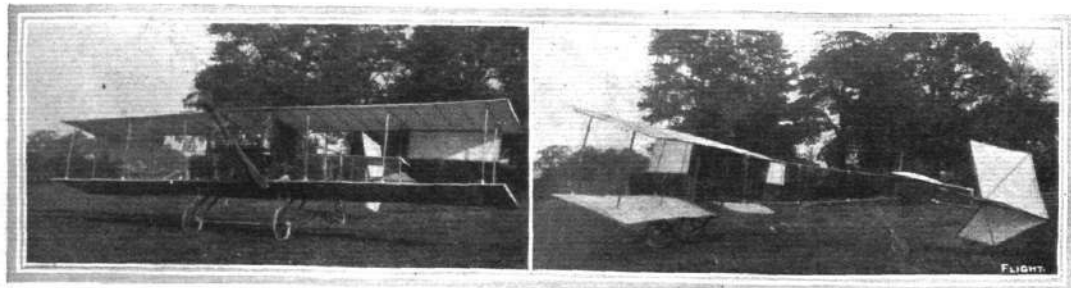
[895] Your correspondent, "Aspiring" (797), is, I think, correct in thinking that a machine with a dihedral angle, as shown in his drawing, really has a low centre of gravity, and comes under pendulum laws. But he makes a seemingly common error when he supposes that the pull of gravity will prevent the machine canting over to turn a corner. Really, as the centrifugal force in a turning movement acts in proportion to the mass, the heavy lower part will swing out and cause the machine to cant, but the pull of gravity will, to a certain extent, balance this, and the result will be an angle of cant somewhere between the two forces. If the weight is properly calculated the machine will cant sufficiently to turn, but cannot possibly turn over.

Manchester Street, W.

W. LE MAÎTRE.

### WIRING OF BIPLANES.

[896] Having, in conjunction with Mr. G. B. Wood, built a glider of the Farman type in a very small shop, which necessitated its ready dismantlement into several parts, I should like to give other readers of **FLIGHT** a hint that will be of great assistance to them if they are ever engaged in a similar task. I found it to be extremely useful to see that all the wire strainers are arranged in the same way, that is to say, having, for example, the right-hand thread at the top. If this system is adhered to throughout, it is a much easier matter to tighten the wires or loosen them, for otherwise much time is spent in finding out which way to turn individual strainers. I would even go so far as to suggest that manufacturers of wire



The C.R. Biplane, No. 2.



strainers should turn a small ring on the barrel in order to indicate which end is the right-hand thread.  
Brixton.

S. C. MAAS.

### GYROSCOPIC STABILISERS.

[897] One of the aeroplanes at the Burton flying meeting suddenly turned sideways when nearing the ground—struck on its left plane and was practically smashed.

Now I believe that a rotating wheel will prevent similar accidents, that is, if fixed to revolve the same way that the aeroplane is going. This is my argument: A bicycle wheel, when held in the hands by the spindle and spinning at a good rate, is practically impossible to be made to turn on its side. Will you please tell me in your weekly, *FLIGHT*, whether my idea is of any use.

Burton-on-Trent.

W. J. BRANDRICK.

[The force observed by our correspondent in a spinning bicycle wheel is a gyroscopic force, which has often been suggested as a means of obtaining stability in aeroplanes. It is questionable whether the gyroscopic force itself would be sufficient to maintain stability, but an alternative method of employing the same principle is to use a small gyroscope to switch on auxiliary machinery of adequate power for moving balancers or other controlling devices.—Ed.]

### PENDULUM STABILITY.

[898] Having brought into consideration that a good percentage of aviation accidents up to date have been due to some treacherous side gust, I think automatic stability is of vital importance. It has always appealed to me that some sort of a keel is necessary to keep an aeroplane steady when flying in anything but a calm atmosphere. My opinion is that if the pilot or engine be suspended rigidly below the main plane, at the same distance from the centre of plane as it is from the centre of plane to the tip of one wing, the leverage obtained by pendulum action would be sufficient to counterbalance the effect of a side gust.

Otherwise in preference obtain the leverage required by making the skis and wheels adjustable to be raised or lowered either automatically or at the pilot's discretion, according to the velocity of the wind. At all events a machine so constructed that would always, voluntarily or involuntarily, come to earth on landing chassis, would be one step nearer the successful future of the heavier-than-air machine.

Would be greatly obliged to hear your expert opinion on this matter, and thanking you in anticipation.

Audlem.

THOS. KELHAM.

[Most people who first take up the subject of natural stability hit upon the idea of the pendulum, and the more mechanical they are the more do they appear to see in this system a thoroughly sound solution to the problem. We have frequently had to point out, however, that in practice the pendulum system of stability—that is to say the underhung load—has not proved itself so desirable as might have been expected. Lilienthal and Pilcher, for example, both assumed this position when flying their gliders, and it is, at any rate, significant that both machines were difficult to handle.—Ed.]

### CYCLOPLANE.

[899] May I ask, through the columns of your valuable paper, some questions concerning your correspondent, Jack Henshaw's (804) small cycloplane?

First, what is the size of his proposed enlarged one?

Second, what material does he use, and what wood, with dimensions, is employed?

Third, what is the cost of the whole machine, minus cycle, illustrated in *FLIGHT* of October 8th?

I can fairly correctly judge his method of making planes, &c., but should like to know the above details, as I am also thinking of making one to use with controls, both with and without a cycle.

Hendon.

A. CURTIS.

### GIVAUDIN AEROPLANE.

[900] Could any reader of *FLIGHT* give me particulars relating to the Givaudin aeroplane, of which I wish to have as many details as possible.

Northallerton.

G. F. WHITWORTH.

### THE NEALE CONTROL.

[901] I notice a letter in your issue of October 22nd by Mr. Neale in which he appears to claim a patent over screening control of aeroplanes.

I believe I used this control on models and aeroplanes some time before Mr. Neale; they were on my glider at Llandudno in 1908, and on my plane at Doncaster meeting last year, and I contend such controls are not novel.

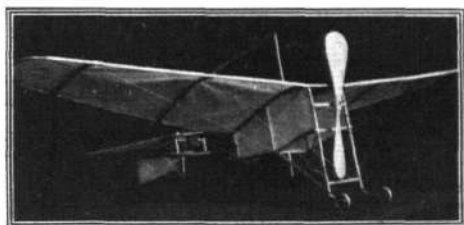
Llandudno.

EDWARD MINES.

## MODELS.

### MODEL CHASSIS.

[902] My model monoplane, of which I send a photo, is entirely my own make throughout: wood used being  $\frac{1}{8}$  sq. in. American bent wood. The span is 47 ins., length, 30 ins.;



height, 15 ins.; weight, 6½ ozs. (without motor). The wings are single surfaced, and made to warp, also to fold back when being carried about. The chord is 9 ins. tapering to 6 ins., and camber 1 in. 12. The propeller, 11 ins., I carved from a piece of deal ½ in. thick, and then steamed to increase pitch to 12 ins.

The landing arrangement is a combination of wheels and skids, with rubber shock absorbers (wheels in photo are only temporary).

All stays, &c., are of floral wire, and mast is a piece of aluminium tubing.

All steering and elevating wires are passed through a small brass terminal, so that when set they can be held tight in position.

The motor I propose using is four sections of  $\frac{1}{8}$  in. rubber, each containing twelve strands 18 ins. long, one to wind the other up so as to get the equivalent to 6 ft. Can any reader give me any better suggestion? When the model is complete the cost, as far as I can judge, will be between six and seven shillings. Not a dear one.

Hoping other readers have had as many happy hours as I have out of *FLIGHT*.

Pimlico.

W. SPEAKE.

### MODEL BLÉRIOT.

[903] I am building a model monoplane of the Blériot type, and would like some reader to tell me where the centre of gravity should be. The machine is 3 ft. 6 ins. long, and weighs, without wings, 1 lb. 3 ozs. What amount of supporting surface ought I to have?

West Acton.

J. TORROMÉ.

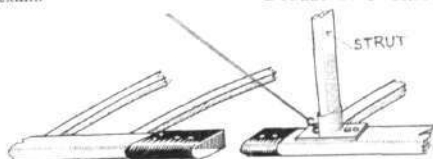
### MODEL BIPLANE.

[904] Could you, through your columns, advise me as to a suitable way of making portions of the main decks of a biplane glider di-joinable?

The machine I am constructing has double-surfaced planes with blunt entries.

Bexhill.

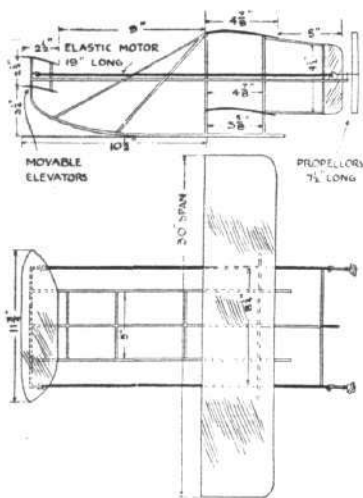
DUDLEY G. O. HISCOX.



[The accompanying sketch illustrates a simple socket joint that should be suitable for the purpose.—Ed.]

### MODEL WRIGHT BIPLANE.

[905] In your issue of *FLIGHT*, dated September 10th, I noticed Mr. Pugh's letter (746), in which he states that he has made six monoplanes and one biplane which he cannot get to fly. He seems to have been much in the same boat that I was. However, I think I can advise him a little.



5 ozs. if possible for the complete model.  
Haydock.

I am not in favour of model aeroplanes with the main plane leading; having made three models of well-known monoplanes, which I cannot say have been any use at all, yet the first biplane I made was a fair success.

However, I enclose rough sketch of Wright biplane (a type which is a good flyer in models) which I think Mr. Pugh will find to be a good flyer if he constructs as sketch, which should cause machine to tilt slightly frontwards when holding by the front edge of the top main plane. He should try to keep weight down under

TOM BROWN.

## MODEL CONSTRUCTION.

[906] I have pleasure in enclosing a photo of a model Farman which I have just completed. It is driven by an elastic motor, having 21 skeins of elastic. The propeller is a Gamage 7-inch.

Up to now I have had every success with the model; it will run



on smooth ground and then raise itself about 5 ft. from ground and fly for 70 feet.

The motor takes 3 separate skeins of elastic, and 7 on each, amounting to 21, which I purchased from A. Melcombe, Bedford, for 4s. 6d. The main planes are 2 ft. 6 ins. long.

I am now about to start a Blériot cross-Channel type.

Lewes.

SYDNEY A. MALVISI.

## PUBLICATIONS RECEIVED.

### Catalogues.

Gnome Moteurs d'Aviation. Société des Moteurs Gnome, 49, Rue Lahtie, Paris.

Everything Aviat. C. Grahame-White and Co., 1, Albemarle Street, Piccadilly, W.

Materials for Model Making. T. W. K. Clarke and Co., Crown Works, High Street, Kingston-on-Thames.

### RECORDS.

Distance and Duration.—Maurice Tabuteau (France), at Etampes, on a Maurice Farman biplane fitted with Renault motor: 465 kiloms. (290 miles) in 6h. 1m. 35s.

Speed.—J. Radley (Great Britain), at Lanark, on a Blériot monoplane with Gnome engine: 1 mile in 47 1/2 secs. = 75.95 m.p.h.

Altitude.—Johnstone (America), at Belmont Park, N.Y., on a Wright biplane fitted with Wright motor: 9,714 feet.

## Aeronautical Patents Published.

Applied for in 1909.

Published November 17th, 1910.

25,116. E. C. KNY. Heavier-than-air machines.  
25,726. SIR R. A. S. PAGET. Control of flying machines.

Applied for in 1910.

Published November 17th, 1910.

2,118. F. ICASATE-LARIOS. Flying machines.  
12,164. J. E. COOPER. Airships for military use.

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